THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXI. No. 1813.] LONDON, FEBRUARY 8, 1898. [50TH YEAR. PRICE 6d.

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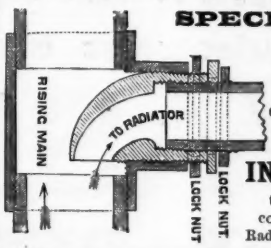

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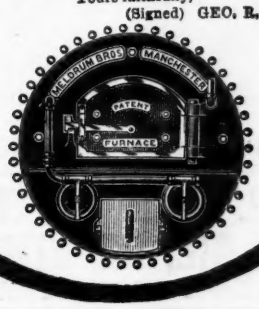
(Signed) GEO. R. HISLOP.



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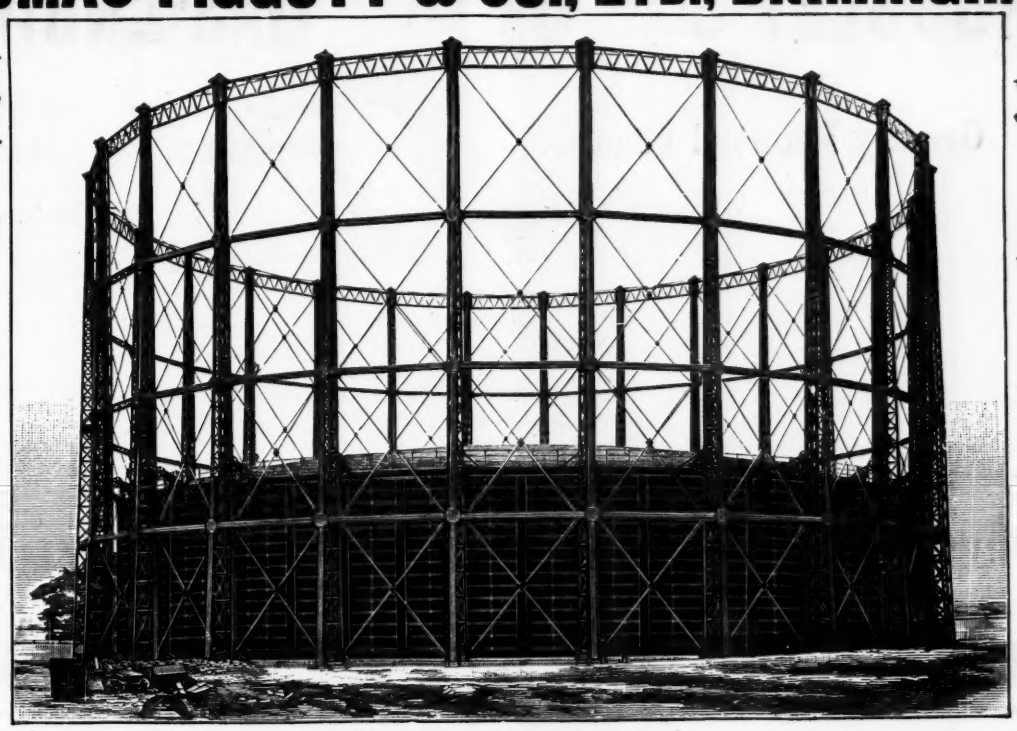

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Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

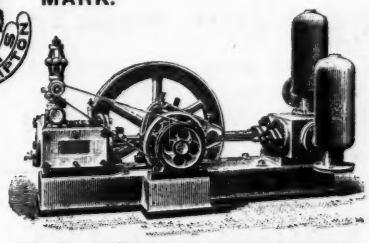

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

Fig. 712 "DOUBLE-RAM" STEAM-PUMP.

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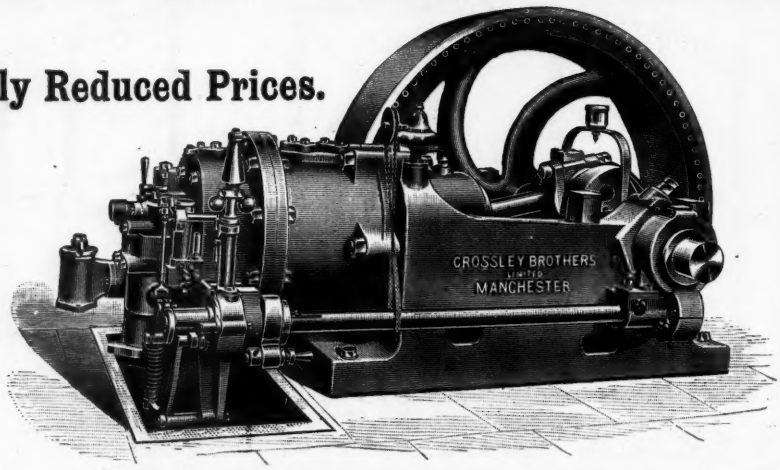

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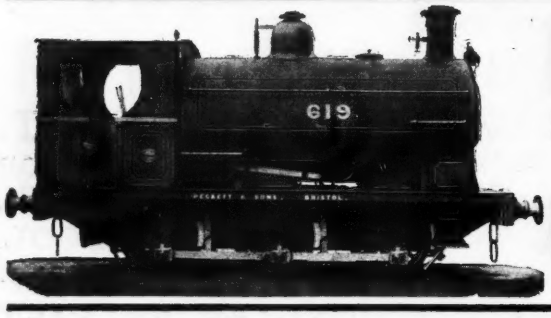

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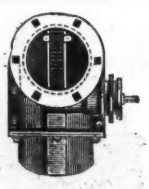

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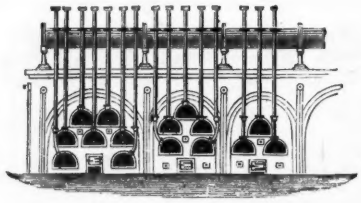

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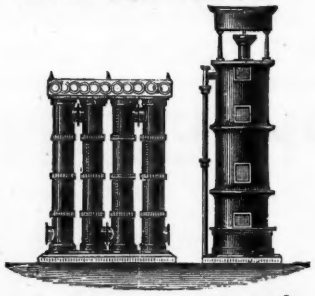

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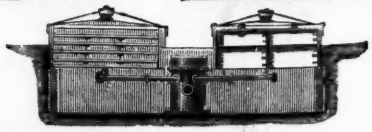

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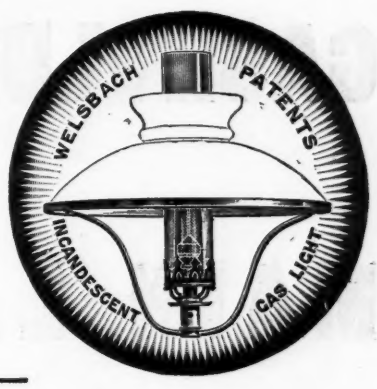

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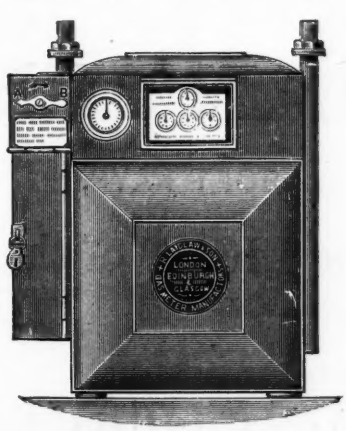

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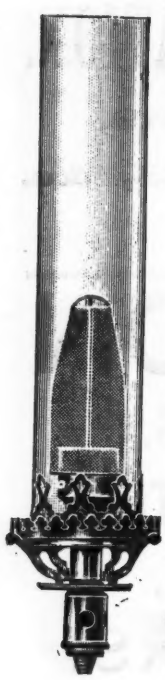

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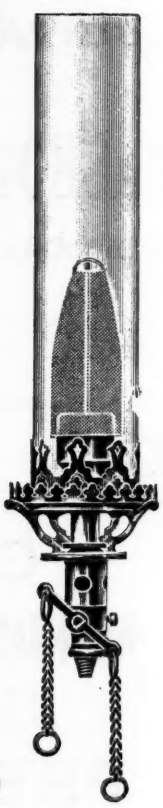

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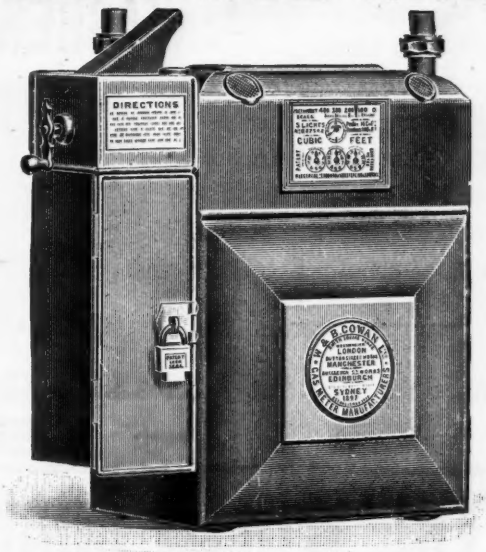

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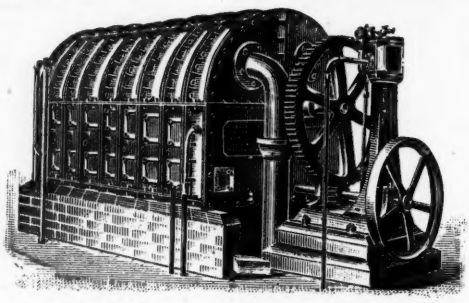

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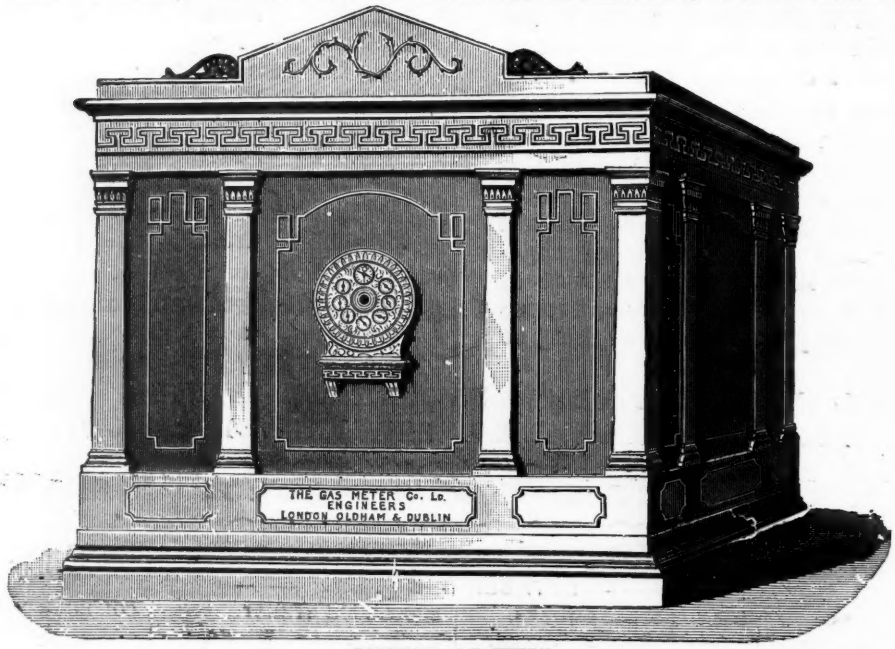

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Brussels (Second Contract)	700,000	Lea Bridge (Second Contract)	350,000
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Santiago	400,000	Brentford	1,200,000
Swansea	750,000	Commercial Gas Co.	850,000
Manchester	3,000,000	Commercial Gas Co. (Second Contract)	850,000
Brighton	1,750,000	Bridlington	125,000
Preston	1,500,000	Middlesbrough	1,250,000
New York	1,200,000	Croydon	1,250,000
Southport	750,000	L. & N.W. Railway, Crewe	700,000
Bath	1,000,000	Taunton	225,000
Newburgh, N.Y.	350,000	Lawrence, Mass.	400,000
Newburgh, N.Y. (Second Contract)	250,000	Rotterdam	850,000
Hoylake	125,000	Dorking	125,000
Coventry	600,000	McKeesport, Pa.	500,000
Coventry (Second Contract)	600,000	The Gaslight and Coke Co., Bromley	3,600,000
Bordentown, N.J.	125,000	The Gaslight and Coke Co., Nine Elms	2,650,000
Winchester	200,000	New York (Remodelled)	11,000,000
Shanghai	225,000	Scarborough	800,000
Holyoke, Mass.	600,000		

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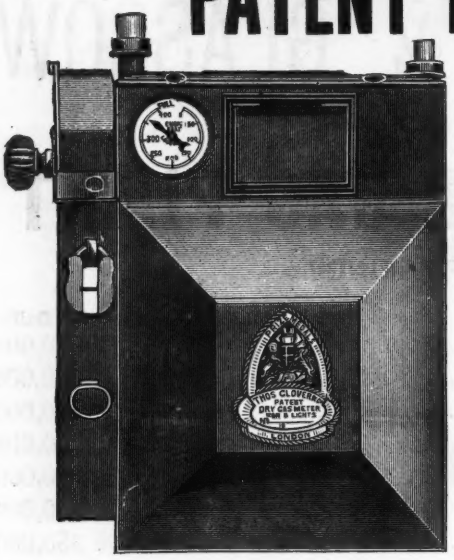

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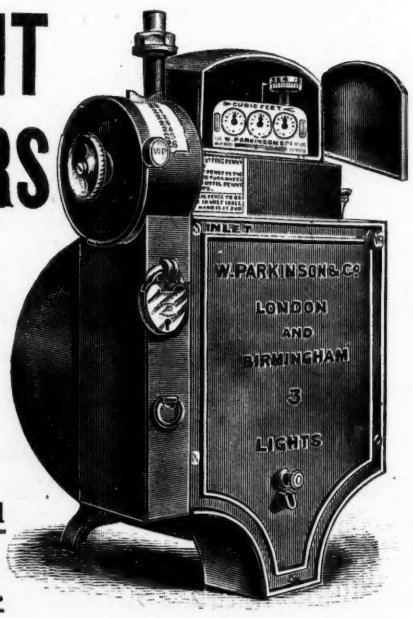

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[See also Advt. p. 320.

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EDITORIAL NOTES.

Meeting of The Gaslight and Coke Company—An Impeachment.

THE meeting of The Gaslight and Coke Company last Friday was a large one—measured by the average attendance on previous occasions and the seating capacity of the apartment used for the purpose during the last four or five years; but it was by no means a full or a representative one, judged with regard to the magnitude of the Company or to the critical position of the undertaking at the present time. It might have been supposed that, after receiving such a questionable statement of accounts for the past half year, more of the proprietors would have been anxious to attend the meeting, and hear, from those responsible for bringing the undertaking into its actual condition, how it is proposed to restore it to a satisfactory state. It can be said truly, however, that those proprietors who did attend followed the proceedings with manifest interest; and the general tenor of their exclamations and the direction of their applause indicated that the official optimism of the Board did not extend much beyond the table. The Governor's speech in moving the reception of the report and accounts was a very careful composition, and was read throughout. It was prepared with an eye to the "popular" aspect of the concerns of a Gas Company; and a good half of it dealt with the state of the weather and the effect of meteorological conditions upon the sale of gas and coke. It was impossible to talk about fogs to the exclusion of other matters, however; and therefore at last a very gingerly-worded announcement conveyed the serious intimation that the price of gas would have to be raised in order "to "secure to the shareholders their statutory dividend." A little later—the ice having been broken in this way—the admission was made that this would mean a "small "diminution" in the rate of dividend that the Company have paid, but not earned, for some time past. The Governor did not say at the first that the statutory dividend which it was thus proposed to "secure" was of the same amount as before. It must have been a painful task for the Governor to have to make this confession; but there was worse to follow.

We must decline to summarize here the various counts of the tremendous indictment of the administration of the Company which Mr. George Livesey delivered on this truly memorable occasion. Those of our readers who are at all interested in the affairs and prospects of the biggest Gas Company in the world must read in our report of Mr. Livesey's speech what he had to advance in support of his declaration that the salvation of the undertaking depends upon the retirement of the Governor and the Secretary and General Manager. The facts and figures are his; the arrangement is also his; and his is the deduction from the evidence brought forward. A graver situation for any gas administration, however constituted, was never created than that in which the Horseferry Road authorities now stand. The only question worth thinking about is what the impeached officials will do. It cannot be held, even by his best friends, that the Governor's reply to Mr. Livesey was an answer. So much was not to be expected on the instant; but something will have to be done, and done quickly. It is doubtless painful to be told to one's face that one is incapable; but the seriousness of the imputation depends upon the evidence on which it is made, the circumstances amid which it is published, and the character of the person making it. If these considerations are taken into account in the present case, the only possible conclusion is too obvious to need expression. There is, of course, more at stake than the personal interest. The Gaslight and Coke Company is a great public institution; and the system of gas legislation of which it is the most important example is on its trial with it. The simple fact that the Board of The Gaslight and Coke Company cannot make both ends meet under the existing conditions, is sufficient of itself to bring the whole connection—Company and system—into judgment.

The South Metropolitan Report and Accounts.

THE report and accounts of the South Metropolitan Gas Company for the past half year will be found in another part of this issue of the "JOURNAL." The general meeting is called for the 16th inst. The report is couched in the same incisive style as usual, characterized by abrupt

assertions which are sometimes arguments in disguise. This time—without recapitulating the principal figures of the accounts—the report plunges straightway into the intricacies of the gas residuals markets. It declares that coke is unnaturally depressed, and that tar "has sunk "considerably below its mere value as fuel." It is indeed remarkable that tar, "with sub-products of enormous "value obtainable only from it, realizes less per gallon "now than it did when the sub-products consisted only of "naphtha, creosote, and pitch." Notwithstanding the low values of residuals, however, the Directors observe with justifiable pride that the earnings have been sufficient to pay the usual dividend, and carry something over to the good. The working of the profit-sharing scheme is commented upon, this time in order to acknowledge the reasonableness of the workmen's representatives in the matter of agreeing to a reduction of the rate of interest allowed on their deposits, proportionately to the decreased earning power of the ordinary capital. There has been a satisfactory settlement of the rating disputes in the Company's district, the benefit of which is prospective.

Turning to the accounts it will be observed that several entries are split up so as to give more detailed information than heretofore respecting the objects of expenditure and the sources of income. All this is interesting; but in some respects it renders comparisons difficult. The sale of gas has increased by 6 per cent. Meters and stoves are multiplying in the same way. The revenue from residuals, however, has shrunk almost as much as that from gas has grown. Still the gross income has risen from £647,337 to £674,914. On the other hand, the cost of coals has risen from £231,714 to £243,930. Repairs and maintenance are exceptionally heavy, owing, as the report explains, to a large amount of old plant having been renewed and improved. Distribution costs considerably less; the reason not being similarly explained. For the first time the item of lighting and repairing public lamps appears separately in the accounts. This service appears to be charged at cost price, and works out to a fraction over 7s. per lamp per annum. The law and parliamentary charges are small for the half year. Altogether, the expenditure on revenue account amounted to £499,856; the gross profit being £175,057—compared with £164,786 for the corresponding period of the previous year. The other accounts do not call for particular comment. The unaccounted-for gas has been substantially reduced. There is a somewhat heavy stock of coke on hand; but the tar has been got rid of in accordance with the sound principle of selling everything for what it will fetch.

After the Engineers' Strike.

Little now remains to be said about the labour trouble in the engineering trade, which has been a "standing dish" in these columns for so many months. It has gone the way of Bethesda—a way which must inevitably be taken by all strikes originated in Presumption, fostered by Ignorance, and maintained by Lying and Deceit. There is no need to mince matters. The Amalgamated Society of Engineers have come to utter grief. Like gamblers in all ages, the temporary controllers of the destinies of this Trade Union staked their all and lost, upon a hopeless hazard. There is something to be said for the view that the officials of the A.S.E. may have chosen between two evils—to run the chance of gaining something by a last stand, or see the Society perish miserably by insolvency. This explanation of the "causing cause" of a campaign which has ended so disastrously for those who provoked it does not apply to the Trade Unions other than the A.S.E. who formed part of the historic Joint Committee. The point, however, is not of current interest. What is of real importance is the proof supplied by the result of the affair that Trade Unionism is weaker than Federated Capital. Saying this does not convey anything further. It does not imply, for instance, on which side the right is to be found. Now it is quite conceivable that the right, which is to-day on one side—it matters not which in the argument—may be on the other to-morrow. Is there anything in either Trade Unionism or Capitalistic Federation to identify either of these agencies with right and justice? Nothing. Are we, then, as the net result of the late strike, confronted with the terrible spectacle of two unmoral agencies, capable of being employed for any purpose that may commend itself to the approval of the leaders for the time being, partaking the industrial empire unequally between them? If so, the strike would be chargeable with greater mischief than has yet been ascribed to it from any quarter.

It is not to be believed that the main result of the strike was anything of the kind. Strange as it may sound in the ears of many in these days, when worthy people profess to see in "Labour" nothing but what is good, and in "Capital" nothing but what is evil, the engineering employers won in the recent struggle because they were in the right, quite as much as because they were also strong. Time servers and popularity hunters may raise all the dust they can to hide the miserable fall of the principles represented by Mr. Barnes, of the A.S.E., and his abettors. But it is the worst of treason to the working classes to pretend, as the "Daily News" did the other day, that the strikers have a list of gains to set against the solid victory of their masters. The A.S.E. has gained nothing, and lost a great deal that had been painfully acquired by years of scheming and patient organizing. Those men are to be honoured who did not wait for the result of the struggle to point out where the right lay. Foremost of these was the Duke of Argyll; but this was only to be expected of the author of the book which sums up all that is sound in industrial economics, and a statesman who is not in need of votes.

Meanwhile, it would be ludicrous if it were not so sad to see how the professional "Labour leaders" are desperately trying to pick up another string to pull in place of the one that has broken in their clumsy hands. Mr. Tom Mann, it is reported, took the chair the other day at a "conference" which unanimously adopted a "manifesto" signed by himself, favouring "the formation of a Union "that shall embrace all sections of workers, whether "classed as skilled or unskilled." This precious Union would be "both political and industrial;" and it would have nothing to do with such pettifogging cares as providing sick, accident, superannuation, or death benefits. No; the true function of the Newest of New Unionism, we are assured, consists in "vigorously working to raise the "standard of life of the wage-workers in the most effective "fashion." What this fashion is to be would, of course, be left to the decision of the leaders of the movement, who would be well paid for the performance. It would probably work out in the same old way—bands, banners, and mass meetings for the multitude; seats in Parliament, offices, and salaries for the few. The confidence trick all over again!

The Problem of London Government.

The municipal affairs of the Metropolis have engaged the attention of the London newspapers of late, in connection with the approaching County Council elections, and the prospects of a further reorganization of the Metropolitan Local Authorities outside the City. Preparations are in progress for interesting the electors in the issues that will be really or ostensibly at stake in this particular election; but there are no signs to indicate that Londoners are more likely than is their wont to trouble themselves about the matter. It is impossible to take up a London newspaper without deriving from it the impression that, if the conductors of these publications know how to cater to the public taste, the very last thing their readers care to be informed about is the subject of Metropolitan Local Government. Anything and everything, from the Indian frontier war or *l'affaire Dreyfus* down to a gate-money cricket match, is preferred, by those who are responsible for the contents of the London newspapers, to the question of who is to have the spending of London rates, and what the money should be spent upon. Yet the issue of the pending election is a grave one. All sorts of minor causes are involved; but the real question is whether London is to be governed, so far as the County Council are concerned, upon the principles of Social Democracy, or in accordance with the ordered progress along the old ways of which almost every Municipality throughout the rest of the United Kingdom is a successful exponent. The most salient principle of Social Democracy in this connection, is to help people who do not help themselves, at other people's expense. Individual initiative and private enterprise are to be excluded, according to the "popular" understanding of this principle, from an unlimited range of employments growing out of the necessities of a huge town population; and municipalized undertakings are to occupy the field. There is no limit to the amount of local rating, according to this theory of local government; and the usual sources of this

revenue are to be supplemented by imposts upon ground-rents and the "betterments" of town properties.

An important letter of Sir J. Lubbock to "The Times" of the 2nd inst. puts this matter in a cogent way that should carry conviction to the mind of the ratepayers who have the determination of the issue—if they would but take the trouble to read it. Put shortly, the Progressive Party wish the London County Council to become the Universal Providers of everything that London collectively wants, or may be supposed to be the better for having. They would supply water, "provide and manage dwellings for the "working classes and lodging-houses for tramps; manage "the Gas Companies, fire insurance, pawnbrokers' shops, "and tramways; carry on markets; undertake general "building business; take over the docks; and even work "the bakers' shops." Mr. Sidney Webb, an industrious and pushing member of the Progressive Party, told the Labour Commission that he could not discriminate between the reasons for municipalizing gas and water supply and the supply of bread. Also, he saw no reason why the rates should not go to 20s. in the pound. As Sir John Lubbock says, "the proper business of the London County Council "would thus be entirely subordinate to a number of "gigantic financial and mercantile undertakings, and the "people of London would be placed under the control of "the largest trading establishment the world has ever seen." And it would be a trading establishment carried on under the reverse of economical and commercial principles.

A sort of check has been put upon the Progressive dream of unlimited expansion of the County Council by the hints dropped by Lord Salisbury and other members of the Government that London may be endowed with improved municipal institutions of a decentralized character. The idea of this suggestion is that the apathy respecting their own local affairs which is so deplorable a characteristic of Londoners, would disappear if the great natural divisions of the Metropolitan Province were to be erected into Municipal Corporations, with all the powers and dignities properly appertaining thereunto. It is not a new idea, and one cannot be sanguine that if carried out it would have the desired effect. But it is, at any rate, a natural and reasonable proposition, and appears to offer a preponderance of advantages over drawbacks. After all is said and done, however, the problem of London self-government is, and must remain, as unique in character as the circumstances which produce it.

WATER AND SANITARY AFFAIRS.

Some part of Sir Alexander Binnie's evidence before Lord Llandaff's Commission, at the commencement of last week, was evidently personal rather than official. It may be less important on that account, but none the less interesting. This kind of evidence came out more especially during the cross-examination conducted by Mr. Pope, who explained that he sought to understand what Sir A. Binnie suggested as to the management of the water supply. The latter thereupon stated that his object was to submit to the Commission a practical scheme for the solution of the London Water Question. The outline of his plan was that the present undertakings should be purchased by a central authority, so constituted that the County Council should be represented upon it to the extent of 80 per cent. The undertakings should be purchased in the first instance by the Council alone; although Sir Alexander wished to be understood, when referring to the Council, as speaking of that body in conjunction with the City of London. In addition, the other bodies interested should be represented in proportion to their requirements of water. The central authority thus created would "have jurisdiction over "the entire area of Water London." As to subsequent arrangements, Sir Alexander said he "recognized that it "would be difficult, if the County Council purchased the "water undertakings, to agree with the other local "authorities as to selling them parts." According to the views thus expressed, the County Council would buy up the whole affair, and afterwards dominate in the management by forming four-fifths of the central water authority. The main features of the scheme include the creation of a Water Board, very much on the same lines as those laid down by Lord James of Hereford in his amended Bill. But what are to be the terms of purchase? Failing agreement, Sir A. Binnie proposes arbitration. But what kind of arbitration? Not such as is provided for by the Lands Clauses Act, which has hitherto been found sufficient in the purchase of water undertakings by municipal authorities. There is to be a "special arbitration clause;" and past experience shows that the Council would urge such conditions as would require the arbitrators to admit everything which told against the Companies, and to reject all those considerations which would tell in their favour. Injustice could thus be legalized, supposing Parliament were found ready to penalize the Water Companies and favour the County Council. So the "little Parliament" would have it; but the greater power is at a higher level.

The aphorism that every man lives in a world of his own is well illustrated by one remark in which Sir A. Binnie put himself into an awkward attitude towards the Commission. According to his view of the matter, there was "an idea in the public mind" that purchase should take place; and he went on to say that "nothing would "stop the agitation of the public but the getting of what "they wanted." Two assumptions are to be observed in this out-of-the-way statement. Sir A. Binnie is so far a proficient in thought-reading that he professes to discern a certain "idea" in the public mind. We need only say this is "not evidence." In the next place, he ventures to say that nothing less than the gratification of this idea will stop the agitation of the public. We might almost suppose that something revolutionary was in the air, and that at least the existence of the Government was threatened. Mr. Pope showed Sir Alexander the dilemma into which the latter had fallen; the conclusion being that if the Commission decided against purchase as disadvantageous, the "agitation" would go on just the same. It is not the first time the Royal Commissioners have been subject to an intimation that if they wish to come out of the inquiry with *éclat* they must present such a report as will please the ruling party at Spring Gardens. "We are "the public" appears to be the sentiment prevailing in the County Council; and the "idea" that is uppermost among the Progressives is supposed to be that which exists in the public mind. Even if this were true, it has to be remembered that the Commissioners are seeking for further evidence than has yet been laid before the public in regard to the financial results likely to accrue if the water supply is transferred to a public authority. We can give Sir A. Binnie the credit of intending nothing disrespectful to the Commission. Inadvertently he said what he thought; and the remark he made serves to show the idea which exists in his own mind. Proceeding to discuss the more directly engineering aspect, he promises a supply of about 130 million gallons per day, to be brought from Wales at a cost of £14,000,000. But, as we have lately observed, when the supply has been brought, it will have to be distributed; and hence arises a necessity for buying up the Companies, so as to have the use of their plant. The quantity of water thus specified is, of course, merely supplemental; and a much larger outlay would be necessary to give London all that it wants and will want. Sir A. Binnie would at once impose on the Water Companies very serious obligations in the nature of compensation water, and would make short work of agreements between them and the Conservators of the Thames. After the evidence of the Chief Engineer, the Commissioners entered on a mass of particulars given by Mr. H. E. Haward, the Council's Comptroller. This gentleman finds fault with the things of the past; but it is not clear that he opens up any very cheering prospect for the consumer, supposing the future financing of the water supply to be entrusted to the County Council.

The Municipal Year Book for 1898, a copy of which we have received from the publishers (Messrs. Edward Lloyd, Limited), presents in a compact form a mass of information relating to municipal work all over the country. It opens with a chapter on "Municipal Government in London;" and then comes a description of the government of English towns, which are divided into three categories—great towns, county boroughs, and other incorporated towns. Special chapters are devoted to the supply of gas, water, and electricity, the management of tramways, and the erection of artisans' dwellings. The book contains lists of all the town councillors throughout the country, and of the officials employed by the various authorities. The statistics given have been obtained from official sources, so as to ensure accuracy; and the whole of the matter, which occupies 500 pages, has been thoroughly revised.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 303.)

THE Stock Markets were fairly active during the past week; and, on the whole, prices have shown a steady tendency, though here and there some declines have to be recorded. The public are still holding off from entering into speculative transactions; while investors are showing little inclination to subscribe for new stocks bearing a low rate of interest. The failure of the Liverpool Corporation to borrow money at 2½ per cent. has this week been followed by Leicester only receiving applications for £125,158, bearing 2½ per cent. interest, out of £450,000 required. Gilt-edged securities have exhibited steadiness, though Consols were a little dull on Saturday; and Indian sterling loans were also slightly easier. The Money Market has been weaker. But floating balances are less plentiful; and the rates for day-to-day loans are maintained. In the Miscellaneous Market, a very large business has been done in Welsbach Incandescent issues. The ordinary stock was run up to 127, from which it fell to 119½ on realizations to secure profits; but the price rallied to 120½. The preference stock, and deferred £1 shares are also below the best points touched. All the dealings in these shares are for the special settlement which has not yet been fixed. A moderate amount of business has been done in Gas stocks; and only six changes are recorded on the week. The feature has been the great weakness of Gaslight "A." On Monday, business was done at 315½; whereas on Saturday stock changed hands as low as 306—showing a difference of 9½; but the fall in the official quotation is 7½ on the week. The decline in the value of the stock is due to the disappointing statements made at the meeting. The secured issues have not been affected; their values being maintained throughout. There has been very little doing in the other Metropolitan Gas Companies' stocks; and prices are unaltered. The Suburban and Provincial section has also been steady. The announcement of a dividend at the rate of 12 per cent. on the Brentford consolidated stock, and 9 per cent. on the new stock, being the same as the last distribution, had no effect on market values. The report refers to a small issue of fresh capital, which will be sold by tender. Continental Companies have been fairly active. Imperial advanced 2; and Ottoman, ¼. Buenos Ayres 4 per cent. debentures recovered 1 per cent. of their dividend. Business in Water Companies has been quiet; but the tendency is good. Southwark and Vauxhall stocks have improved, and also West Middlesex debentures.

The daily operations were: On Monday, there was very little doing, except in Gaslight "A," which was fairly active and easier; business being recorded between 314 and 315½. "J" preference was also dealt in at 322; South Metropolitan, between 145½ and 146½; Imperial Continental, at 219; Continental Union, at 251; and River Plate, at 9½. Water stocks were very quiet. On Tuesday, business was more distributed throughout the list. Gaslight "A" was again weak, and fell another 1 to 312-315; dealings being recorded at 313. Commercial new stock marked 258; Continental Union, 252½; Imperial Continental, 219½ and 220; Metropolitan of Melbourne, 113½; Monte Video, 15¼; while River Plate was active at a rise of ¼ to 9¾-10. There was a little more doing in Water stocks; business being recorded in Chelsea, East London, Southwark "A," and West Middlesex. On Wednesday, the feature was the large business done in Gaslight "A," which fell to 310-312. In Water stocks, Vauxhall "A" debentures rose 1 to 147-150; and West Middlesex 4½ per cent. debentures 1 to 163-166. Thursday was also a quiet day. But a further fall of 1½ was recorded in Gaslight "A" to 308-312; while, on the other hand, Imperial Continental ordinary rose 1 to 218-224. Business was done in Brentford at 304. Water stocks were unaltered. On Friday, another fall of 2 was marked in Gaslight "A," to 306-310; while Imperial Continental gained 1 to 219-224, and Buenos Ayres 4 per cent. debentures 1 to 97-99. Saturday was an idle day; but values were sustained in both Gas and Water stocks.

ELECTRIC LIGHTING MEMORANDA.

Dust Destructors and Electric Lighting—The Practice at Ealing—Sewage Sludge as Fuel—An Attack on the City of London.

THE question of the advantage of combining dust destruction, with or without the addition of sewage sludge burning, with the generation of electricity for lighting purposes, continues to occupy the attention of our electrical contemporaries. Our readers are aware that we were called to account by a firm of specialists in this line for having followed the "Electrical Review" in its criticisms of the pretended success at Shoreditch. We have waited in vain to see our contemporary answered. Now the "Electrician" falls into line, and criticizes the Shoreditch performance from its own standpoint. At a recent meeting of the Shoreditch Vestry, Mr. H. E. Kershaw, the Chairman of the Electric Lighting Committee, brought forward the recommendation that, "owing to the unprecedented success of the Vestry's efforts in the combined scheme of the generation of electricity from the steam supplied by the dust destructor," the charge for electricity should be reduced from 6d. per unit for the first two hours, and 4d. per unit afterwards, to 6d. per unit for the first hour and a half, and 2d. per unit afterwards. There was more flourish about the extreme gratification felt by the Committee at this "marked success." Happily, the majority of the Vestry have not parted with all their common sense; and they very prudently thought they would like to wait until they had seen the first year's accounts of the Electric Lighting Committee before joining in Mr. Kershaw's pæan of praise of the destructor and its results. If Mr. Kershaw is blind to the use that is being made of the presumed success of the combined scheme at Shoreditch as a bait for other and even more important local authorities, other people are not; and the bringing forward of such a recommendation as he charged himself with in this instance was a proceeding that laid the Shoreditch Committee open to some invidious suspicions.

Meanwhile, other enterprising speculators in dust destruction have entered upon the field; and where one set of public benefactors are working Shoreditch for all it may be worth, another group are pointing to Leyton as the example to be followed. The Shoreditch people got Lord Kelvin to come and bless them. Not to be outdone, the Leyton party played Sir Douglas Galton. Of course, there has been the inevitable "Press view," in the latter case as in the former. Everybody who attended was carefully instructed as to what he was to look at and what he ought to think of it all. This sort of thing is very cleverly done nowadays; and if the company who attend "Press views" of novelties, or what it is intended to pass off as such, would only "open their mouths and shut their eyes"—to other sources of information—it would save a great deal of subsequent unpleasantness. Unfortunately, matters do not always take the turn desired of them. A pestilent critic of the Leyton and Shoreditch claims in particular, and the qualities of proprietary dust destructors in general, has arisen in the person of Mr. Charles Jones, of Ealing, who knows too much of the subject to cherish any illusions. He asserts that any local authority desiring to burn the refuse of a district can erect for a few hundred pounds a plant competent to deal with the needs of a small town population, without being under the necessity of paying a royalty to anybody or employing a contractor. He does it at Ealing; but there are no "Press views" of such performances as these.

With regard to the "utilization" of the heat of dust destruction for the generation of electricity or any other purpose, Mr. Jones speaks under all reserve. The view he takes of the process as a municipal officer is primarily that of a means of getting rid of a universal nuisance in a simple and efficient manner. The question of profit is with him quite a secondary one. He remarks with regard to the Shoreditch arrangement that he is perfectly content to wait and see the results; and he thinks the local enthusiasts have been a little premature in claiming success. With regard to Leyton, where the incidental burning of sewage sludge was claimed as the distinguishing novelty of the destructor performance, as testified by Sir Douglas Fox and other supposed authorities, Mr. Jones observes that he has been doing this regularly at Ealing ever since 1883. All this shows, as Mr. Jones remarks, how easy it is to mistake the actual position of any "burning question," such as that of the utilization of town's refuse and sewage sludge as fuel under certain conditions. The man who really knows all about the subject is liable to be overlooked, and his work ignored; while some upstart pretender who has the trick of self-advertisement poses as the prophet of a new era.

The wicked part of all this dust-destructor pretence is that it is being advanced as a serious reason why even so important a local authority as the Corporation of the City of London should undertake electric lighting on its own account. Our electrical contemporaries rightly regard this as a little too impudent; forgetting, perhaps, that they have been themselves a little lax in not denouncing projects of the kind when it was merely a question of trying to work in an electric lighting scheme to compete with a gas company. To make dust destruction a trump card to play against a gas undertaking was one thing; to use the same means of attack upon an established electric lighting company is another matter altogether! The circumstance that the City of London Electric Lighting Company charge a somewhat high rate for their supplies is rendering them unpopular. Consumers fail to see in the early history of this undertaking sufficient excuse for the high price of current. So history repeats itself; and the electricity supply of the City of London may reproduce the stirring incidents of the almost forgotten period of the gas supply when Croll was King of the City. Croll, however, did not profess to be able to make good gas from rubbish; and it may be safely assumed that if electric light is to be cheapened in the City of London, it will not be by the aid of dust destructors.

The Engineering Conference of the Institution of Civil Engineers.—The Council of the Institution of Civil Engineers have resolved that the Engineering Conference inaugurated last year is to be biennial; and that, accordingly, the next meeting will be held in London in the spring of 1899.

WATER BILLS FOR 1898.

(*Continued from p. 226.*)

The following Bills will be promoted in the ensuing session of Parliament for the transfer of water undertakings to local authorities:—

The Felixstowe and Walton Water Bill is to authorize the Urban District Council of Felixstowe and Walton to purchase the undertaking of the local Water Company and carry it on within defined limits. The Company were in Parliament in 1895, when the Council obtained permission to promote a Purchase Bill which the Company were restrained from opposing except on clauses. By the Bill the Council are to acquire the undertaking as by compulsion and not by agreement; and in addition to the ascertained value of the property, the Council are to pay the costs of winding up and compensate officers and servants. The sum of £10,000 is to be borrowed for improvement purposes. The loans are to be repayable in 60 years.

The Filey Water and Gas Bill is to authorize the Urban District Council to acquire the undertaking of the local Company by compulsory purchase. The rate for domestic purposes is to be 10 per cent. on the rateable value. Supplies may be metered. The supply of water constantly under pressure may be deferred for two years. Water capital is to be repayable in 50 years. Surplus water profits are to go to the district fund.

The Folkestone Corporation (Water-Works Transfer) Bill is to authorize the Corporation to acquire the undertaking of the Company at a price to be ascertained by arbitration under the Lands Clauses Acts. The water capital is to be redeemable in 60 years; and surplus water profits are to go in the first place to the borough fund.

The Kettering Water Bill is to authorize the Urban District Council of Kettering to purchase the undertaking of the Water Company compulsorily. Rates for domestic supplies by the Council are to range from 8 to 7 per cent., with the higher rate for inns. Rates for metered supplies are proposed for "those owners or occupiers who shall elect to take the water by meter, or who shall be compellable by the Council to accept a supply by meter." A capital sum of £16,500 is required for improvement purposes, repayable in 60 years,

The Matlock Urban District Council Bill is to enable the Council to acquire compulsorily the works and undertaking of the Matlock Water-Works Company, Limited, within six months of the passing of the Act. Clause 14 proposes that "in the event of consideration or value of the undertaking being determined by arbitration, the arbitrators shall have regard to the following among other matters: The title of the Company to their present sources of supply; the adequacy and efficiency of the present sources of water supply, and of the reservoirs, filter-beds, filtration arrangements, wells, mains, conduits, pipes, machinery, and plant of the Company to meet present and future requirements; the probable necessity of the future introduction of a new supply of water or new and improved water-works; and the deductions from any compensation claimed by the Company which may in the opinion of the arbitrators be reasonably made in respect of any defect in title, or in respect of insufficiency of the present storage or filtration of the Company, or in respect of the provision of supplementary supplies of water." Officers may be taken over or compensated. An additional reservoir is to be formed by impounding the Bentley Brook, near Cuckoostone House. Compensation water is to be discharged at the rate of 183,400 gallons per day. All supplies may be metered. The sum of £5000 is to be borrowed for water capital and improvement, redeemable in 60 years. Surplus water profits are to go to the district fund.

The Newhaven and Seaford Water Board Bill is to constitute and incorporate a Water Board for the Urban Districts of Newhaven and Seaford and the Rural District of Newhaven Union, in Sussex, and to transfer to such Board the undertaking of the Newhaven and Seaford Water Company, Limited. The present share capital of the Company is £30,000; and there is a debenture debt of £3000. The constitution of the Board is described. The Chairman may be elected from outside, and receive a salary. The undertaking is to be compulsorily purchased on notice delivered within six months from the passing of the Bill. Various considerations are to be regarded by the arbitrators. Officers and servants of the Company are to be taken over or compensated. Additional works are to be sanctioned, including two pumping-stations and accessory plant, only to be brought into use after the transfer. The works are to be completed within seven years. Rates for domestic supplies are to range from 9 to 6 per cent., with the maximum rate for inns. Public elementary schools are to be supplied by agreement. Rates for meter supplies are specified. The additional capital sum of £90,000 is to be borrowed for water-works purposes, redeemable in 60 years.

The Newtown Water Bill is to authorize the Urban District Council of Newtown to purchase compulsorily the undertaking of the Water Company. Rates for domestic supplies are to range from 8 per cent., upon a diminishing scale which appears to be peculiar to this Bill. The sum of £10,000 is to be borrowed for improvement purposes—all water capital being redeemable in 60 years.

The Northam Urban District Water Bill is to authorize the District Council of Northam, in Devonshire, to construct water-works for the supply of their district. The source of supply is to be an impounding reservoir upon Melbury stream in the parish of Parkham, discharging compensation water at the rate of 67,500 gallons per day. The works are to be completed within seven years. The rate for domestic supplies is to be 10 per cent. on the rateable value. The sum of £27,000 is required for water-works purposes.

The Rochdale Corporation Water Bill is to authorize the Corporation to purchase the undertaking of the Todmorden Water-Works Company upon terms recited in detail. New works are to be added to the water undertaking of the Corporation, comprising a new reservoir, to be called the Gorpley reservoir, to be formed by damming the Howroyd Clough, and two other reservoirs at Ramsden and Hey Head. Waters are to be taken only under particular conditions as to the yield of the drainage area. The works are to be completed within ten years. Additional water capital is required, including £395,000 for the construction of the new works. The conditions under which Corporation stock is issued are to be revised. Surplus water profits are to go to the borough fund. Local authorities and others interested in the districts through which the new works are to be made are to have a right to the supply of water in bulk, by agreement.

The Todmorden Corporation Water Bill is to be construed in connection with the Rochdale Corporation Water Bill above mentioned. Power is sought for the construction of two reservoirs at Gorpley and Howroyd. The distributing plant of Todmorden Water-Works Company within the borough is to be acquired at any time within ten years; but the Company or the Rochdale Corporation are to continue liable to supply water within the borough limits until they are requested to desist. Rates for domestic supplies are to range from 7½ to 6 per cent. All supplies may be by meter. Power of entry for the inspection of fittings is sought. Surplus water profits are to go to the district fund.

The Todmorden Corporation (Water-Works Transfer) Bill is to authorize the Corporation to acquire compulsorily the undertaking of the local Water Company. The whole area of the borough is to be excluded from the water limits of the Corporation of Rochdale.

The Wath-upon-Dearne Urban District Council Bill is to enable the Council to acquire compulsorily the undertaking of the West Melton Water-Works Company, Limited, which dates from 1858, and has a capital of £10,000. The rate for domestic supplies is to be 1s. 1½d. in the pound. The water loan is to be repaid in 50 years.

TRADE UNIONS IN 1896.

The Ninth Report by the Chief Labour Correspondent of the Board of Trade, on Trade Unions, has been published in a new shape, and exhibits several important improvements on the older reports of the kind. Were it not for these official returns, it would be even more difficult than it is to "size up" Trade Unionism. The subject is one of the most conspicuous examples of the trick that some matters of public interest have of looking bigger or smaller in the eyes of different observers, regarding them from various points of view. There are some intelligent people, such as Mr. and Mrs. Sidney Webb, the historians of the Trade Union movement in this country, who seem to think Trade Unionism on the one hand, and what they call "Capital" on the other, are the only things worth consideration in industrial politics. Again, there are others who see in Trade Unionism nothing more than a fungus growth upon the industrial body politic; arguing something unhealthy, either in the organism or in its environment, which calls for removal. From whatever point of view the subject is regarded, however, it is clear that the question of magnitude must be of the first importance. Whether it is a good or a bad thing, we want to know how much of it there is; and this, as already observed, is by no means easy to discover.

When the Labour Department of the Board of Trade undertook to collect returns from such Trade Unions as were willing to supply them, it was discovered that so many were eager to send in particulars that the Department was embarrassed with the wealth of statistics. It was consequently found necessary to make a selection, and confine the publication of financial details to 100 of the principal Unions. Information as to membership only was desired of the bulk of the smaller societies. This plan has worked well, and now there are 1330 trade societies making returns to the Department, covering a nominal membership of 1,487,562. These figures have, very reasonably, suggested the desirability of making a recount of the societies and their membership for the past five years, upon the same basis. This has been done; and the result is that "the Department is able to put forward for the first time a statement showing clearly for a space of five years, the actual ebb and flow of Trade Unions in each group of trades, no longer distorted by the influence of changes in the readiness of societies to furnish returns." The Department officials are to be heartily congratulated upon this performance.

Another important new feature of the report is the statement for every Trade Union of the date of formation; thus showing its age. From these particulars it appears that, on the whole, the average age of the Trade Unions now in existence is about

eighteen years, and that the majority of them have been formed since 1880. If, however, due weight is given to membership, the average age is more than thirty years. The figures seem to indicate that considerable numbers of small local trade societies are formed every year, many of which have only a short existence —becoming frequently merged in the large amalgamated societies. The general character of the present return is officially described as follows: "The bulk of the volume in its present form consists of two detailed tables, occupying together 198 pages—the first showing the age, branches, membership for five years, and address of chief office, for each of the 1330 Trade Unions making returns; the second showing details of funds, contributions, and expenditure on various objects for each of 100 selected societies. These tables are supplemented by comparative tables, showing some for five years and others for seven years, the amount of funds, contributions, and expenditure per head on certain objects."

Mr. H. Llewellyn Smith remarks that there is a point on which inquiries are frequently addressed to the Department. "It is often desired to know the total number of Trade Unionists, and the proportion borne by them to the industrial population of the United Kingdom." The first question can now be practically answered for the first time from the present returns. It is considered that, in round numbers, the total Trade Union membership of the United Kingdom is a million and a half at the outside, making all allowances for the few societies that may have escaped enumeration. It is difficult to return a completely satisfactory answer to the second question in the absence of an accurate census of the manual labour classes who could properly be included in the total for the purpose of comparison. So far as the Department has been able to make an estimate from the sources available, the total for the United Kingdom would appear to be about seven millions; "and if this figure be accepted in the absence of a better, it would appear that of the men in the United Kingdom belonging to the classes from which Trade Unionists are drawn, roughly one in five actually belonged at the end of 1896 to a Trade Union."

Coming to the statistics, it is shown that the largest group of Unions was in the engineering, metal, and shipbuilding trades. The membership of such of these as come into the first hundred numbered 208,297. Their contributions for 1896 amounted to £657,451; and there was spent £473,991. These Unions had a balance in hand of £701,021, or £3 7s. 3d. per head. It is stated that the Ironfounders' Society was formed so long ago as 1809, and the Steam-Engine Makers' in 1824. Ten years later, the Boiler Makers and Iron Shipbuilders' Society came into existence. The present Amalgamated Society of Engineers was formed in 1851.

A very interesting point is the connection between the ebb and flow of Trade Unionism and the general state of trade at particular epochs. The report admits that there is a fluctuation of membership and number of societies "corresponding somewhat to changes in the general condition of trade. . . . It would appear from these figures that the late depression in the state of employment was followed by a falling off in Trade Union membership, and the revival of trade by a corresponding increase in Trade Union membership." It would appear to be the logical inference from this observation that the Trade Union is a satellite of trade rather than a sun, to which rank believers in the system would raise it. This inference is not likely to commend itself to such confirmed Trade Unionists as the leading officials of the Labour Department, yet they cannot completely ignore it. It is openly admitted that the unexampled prosperity of late years enjoyed by the building trades "to some extent" accounts for the steady growth of Trade Union organization in this group. Again, the membership in the metal, engineering, and shipbuilding Trade Unions has fluctuated in correspondence with the state of trade, "to alterations in which this group of industries is peculiarly sensitive." The steadiest Unions of all are those of the textile trades.

It is when we come to the societies of unskilled labourers and men engaged in transport work that the instability of Trade Unionism becomes most prominent. During the last five years, the Unions of agricultural labourers have collapsed, and the Seamen and Firemen's Union has also come to nothing. A veil is discreetly drawn over these deplorable failures; nothing being said about their being attributable to other causes than fluctuation in trade. In the table of membership of the Unions from 1892 to 1896 many significant entries are to be discovered, especially in relation to the vicissitudes of the new societies founded *circa* 1889. The National Amalgamated Coal Porters reckoned 12,000 members in 1892; but this has now sunk to 4000, and both numbers are suspiciously "round." There does not appear to be any check upon their accuracy. One can see what comes of round figures in the example of the National Vehicular Traffic Workers' Union of Great Britain and Ireland, the membership of which dropped in a year from 900 to 100; when the society, being probably unequal to the burden of so great a name, dissolved. A most pathetic entry is that of the National Amalgamated Sailors and Firemen's Union, which claimed to have 20,000 members in 1892, 15,000 members in the following year, and went out of existence in 1894. Another is that of the Dock, Wharf, Riverside, and General Labourers' Union of Great Britain and Ireland, which claimed 22,913 members in 1892. The day of round numbers was to come, however; and now the Secretary, who does not disclose his name, returns the membership at 10,000. There are so many of these dockers' "trade" societies. One was formed so recently as 1894 under the name of the Independent Ship, Riverside, and General Labourers' Union; but it never had more than 26 members, which declined to 9 the following year, when the end came. There is something sad in these dissolutions of Unions founded amid high hopes and sanguine expectations of immediate and future benefit. They mean in every case disappointment, wasted effort, squandered funds, and, only too often, betrayal of trust. Another mournful tale is that of the lame attempts made to import the system of trade societies into unfavourable callings. One has heard, for instance, of the National Union of Clerks; but the membership of this portentous organization numbered only 28 in 1895, and there is no return for 1896. Yet we believe the "General Secretary" used to be mentioned among the orators of mass meetings in Hyde Park; and his authoritative speeches have occasionally been reported in popular newspapers. By the way, why is not the National Union of Elementary Teachers included in these labour tables?

There were fourteen Unions of general labourers in existence in 1896, indicating a considerable amount of overlapping. The largest was the National Union of Gas Workers and General Labourers, which still had 29,730 members, as against 36,108 in 1892. The next in importance was the National Amalgamated Union of Labour—20,846 members, and headquarters at Newcastle-on-Tyne. After this there is a drop to the National Amalgamated Labourers' Union, with 3692 members, and an address at Swansea. The Amalgamated Gas Workers, Brick Makers, and General Labourers' Society, of Birmingham, has 3157 members, and appears to have grown stronger of late.

The financial tables relating to the hundred principal Unions contain some interesting figures. The Amalgamated Engineers had £305,882 in hand at the end of 1896; being far ahead of all others in this respect. The next report will show a difference. The poor Dockers still had £5169 to play with. The Gas Workers had £6321 in hand. The Amalgamated Engineers was the most expensive Society to be in; the average amount of a members' contributions for the year being £3 15s. 9d. The Dockers' was only 11s. 1½d. The cheapest of all the general Unions, however, was the Gas Workers, of 5s. 3d. per head. On the other hand, there was not much to come out of this money. More than half of it went in "dispute benefit," and most of the rest in working and other expenses. The Dockers got even less for their money. The members of this Union paid £5566 in contributions and levies; and £4707 went in working expenses. The advantages of belonging to this and not a few other Unions are not obvious.

OBITUARY.

Mr. R. Insoll, of Eastbourne, died last Tuesday, in his 88th year. He was one of the founders of the Eastbourne Gas Company, and was for many years on the Board. He was also a shareholder in the Eastbourne Water Company.

An old association with the practical work of gas making has just been broken by the death of Mr. Henry Harper, in his 68th year. Deceased commenced his career as a stoker with the Chartered Company, and remained in their service till 1859, when he obtained the position of retort-house foreman under Mr. Horatio Brothers at the works of the Equitable Gas Company. In January, 1873, Mr. Harper was appointed general foreman at the Kensal Green works, and held this position up till his death.

PERSONAL.

Mr. Cecil Ledger has been appointed Secretary of the Cobham Gas Company, in succession to Mr. A. Gower, who has resigned.

The Leeds City Council last Wednesday confirmed the appointment of Mr. W. E. Pettigrew as Manager of the York Street Gas-Works.

We learn that Mr. Maurice Graham, well known in connection with inclined retorts and conveying machinery, has resigned his position and severed his connection with the New Conveyor Company, Limited, Smethwick.

The Sandwich Town Council have appointed Mr. J. Donaldson, of the Tonbridge Gas-Works, Manager of their works; Mr. A. J. Catt, the previous Manager, who is the Borough Engineer, having resigned the position in order to devote more time to his other duties.

The accounts presented at the meeting of The Gaslight and Coke Company last Friday, as well as those of the South Metropolitan Gas Company noticed in another part of the "Journal" to-day, are signed by Sir R. Giffen as the Official Auditor, in succession to Mr. Spencer W. Gore, who took up the duties two years ago on the death of Sir H. Calcraft.

Several changes are reported in the directorate of the Maidstone Gas Company. In consequence of the state of his health, Mr. Ambrose Warde has resigned the chairmanship, and Major Haynes, the Vice-Chairman, has succeeded him. To the position lately occupied by the latter, Mr. W. Bryant has been elected. Messrs. A. Smythe and E. Hills have been chosen to fill the vacancies caused by the retirement from the Board of Mr. Warde and Mr. J. Arkcoll.

NOTES.

Deadening the Vibration of Machinery.

It is well-known that the increase of coal handling and conveying plant in some factories and the extension of the mechanical equipment of places of business, is liable to be attended with the drawback of noise, amounting in some cases to a positive nuisance. For use in curing this evil "Engineering" draws attention to a new article manufactured at the Adlershof Felt-Works, near Berlin, and called by the somewhat absurd name of "iron felt." As a matter of fact strong and long wool fibre is impregnated with petroleum grease, and further to a certain depth with glue, which is subsequently rendered insoluble by treatment with formaldehyde. In certain cases the surface is prepared with vulcanized rubber, and finished smooth. The material is very highly compressed, and put upon the market in the form of plates up to 2 feet square and from 0·4 inch to 2 inches in thickness. The mats are used to bed tramrails, weighbridges, gas-engines, and other like clattering or rocking fittings; and it is claimed for them that they act and last well for the purpose.

The Newest British Lighthouse.

Among the latest triumphs of the Trinity Board are the new Lundy lights, recently described in "Engineering," and constructed in accordance with the plans of Mr. T. Matthews, Engineer-in-Chief to the Board. One of these lights, on the south-east end of the island, is composed of a five-wick petroleum burner giving an initial illumination of 60,000 candles in the beam, which is capable of being reduced to 40,000 candles when the weather is clear. The northern lighthouse is described as fitted with apparatus of entirely new construction, both as regards the dioptric apparatus whereby the light is intensified in the beam, and as regards the mechanical details of the revolving head. The maximum intensity of the beam of this light is 121,000 candles for thick weather; but it can be reduced to 81,000 candles when the atmosphere is clear. This control of the illuminating power is obtained by varying the number of concentric wicks lighted, which is one of the most valuable features of the system, inasmuch as it enables a great saving of oil and energy to be effected when there is no necessity for the maximum power of the light to be shown. We understand that this improvement is due to Mr. Matthews.

New Coal-Handling Methods.

A description has been given in "Engineering" of the coal-loading plant designed and constructed by the Brown Hoisting and Conveying Machine Company, of Cleveland. One of the most interesting features of this plant is the attention that is given to the modern requirement of breaking the coal as little as possible. In England, the loading of coal cargoes is a simple matter of an elevated gantry and a long shoot upon which the small colliery waggons are tipped without much regard for what happens to the coal. In America, coal is carried in 27-ton trucks, which cannot be so easily up-ended. Consequently, these long trucks are run into a tipping carrier, which tilts them over sideways. In order to avoid breaking the coal, the load is caused to slide out sideways, not into a shoot, but into a row of buckets, which are lowered in turn into the ship's hold or lifted into store as the case may be. The Brown plant has many mechanical refinements for securing despatch and saving labour; a staff of ten men and a foreman being enabled to deal with 4000 tons of coal in ten hours. It will be remembered that the importance of preventing coal from being unnecessarily broken, as a preventive of spontaneous combustion, was particularly insisted upon by Professor V. B. Lewes in his inquiry into this subject.

Cause of the Cementitious Quality of Portland Cement.

The chemistry of portland cement has recently been brought up to date in an article published by the "Engineer." The researches of Le Chatelier form the bases of the only coherent and intelligible theory of the nature and properties of hydraulic cements. Fresh work in this direction has been done by Messrs. Newberry, of New York, who have experimented upon the production of hydraulic cements synthetically from the pure chemical components. In this way a number of varieties of quick and slow setting cements were prepared, and much additional information obtained as to the conditions under which these qualities are realizable. The main practical conclusions arrived at by Messrs. Newberry are these: Given complete admixture and thorough burning, sound cement may be produced from a mixture of chalk and clay containing enough lime to provide three equivalents for every equivalent of silica, and two for every one of alumina. In calculating the proportions thus laid down, the percentages of ferric oxide, magnesia, and alkalies should be ignored, provided they are approximately normal. The alumina in a cement mixture is desirable as an aid to the fluxing of the clinker, and provides an aluminate capable of setting in a reasonable time; but is entirely unessential so far as the production of a strong cementitious substance is concerned.

Chemical Reaction at High Temperatures.

Some suggestive observations on the study of chemical reactions at high temperatures have been made by Dr. Charles A. Kohn in an address to the Liverpool Section of the Society of Chemical Industry. It is remarked by way of introduction that the wide range of temperature through which reactions can now be studied is one of the most marked advantages of the conditions of modern experimental investigation. Chemical changes formerly unknown have been realized between the temperatures of solid oxygen and gaseous silicon. Ordinarily the dissociation temperatures of the products of combustion in furnaces, as well as the fusibility of porcelain and other refractory materials, have limited the temperatures of industrial operations to from 1700° to 1800° C. Platinum, which melts at 1775° C. can be refined in the oxy-hydrogen flame, the temperature of which is about 2000° C. This was the highest temperature realizable before the introduction of the electric furnace. The temperature of the latter is that of the electric arc, estimated by Violle at 3500° C.; and Moissan's experiments with his electric furnace go to show that this figure can actually be attained. At this temperature attempts have been made to produce the crystalline form of carbon, but without noteworthy success. The transformation of common coke, with the addition of sand, salt, and sawdust, into "carborundum" is, however, perhaps a greater commercial success than the similar preparation of calcium carbide.

The Painting of Buildings.

Some instructive hints on painting, not of structural ironwork, but of houses and other buildings, may be found in a paper contributed by Mr. L. A. Shuffrey to the recent proceedings of the Architectural Association. To produce a pure white effect Mr. Shuffrey advises bringing forward the ground with two coats of white lead, then one of equal proportions of lead and zinc white, finishing with zinc white, light copal varnish, and turpentine. Linseed oil should be yellow, transparent, and sweet to the taste, with little smell. Boiled oil is more suitable for dark colours and outside work, as it is a better drier. For external ironwork, Mr. Shuffrey knows no better protection than oxide of iron and linseed oil. The chief drawback to the more general use of oxide paint is the colour, which has a very limited range, and if a change is sought by mixing it with other pigments, the protecting qualities of the paint are reduced thereby. Wooden doors exposed to a sunny aspect are a constant source of trouble; but it is suggested that the use of zinc white instead of lead for the ground colour will cure the tendency of such doors to crack and blister. Painting on new woodwork will require at least four coats; and it is better to specify five, as on joinery well prepared four is only just enough. Mr. Shuffrey expresses thankfulness that the fashion of stained and varnished wood-work for interiors has now almost died out. Backs of panelling, or any woodwork which has to be fixed against a wall should have a thick coat of oil colour over the usual priming before fixing. Any filling up required should be done after the second coat, which is mainly of linseed oil and white lead. Three coats are required after filling up. By mixing varnish with the finishing coat an egg-shell gloss is obtained, and this is the finish that appears to Mr. Shuffrey most suitable for work generally. It does not require so much preparation as varnished work, does not show up slight unevennesses, and will bear washing. It is sometimes called a bastard flat.

Institution of Gas Engineers.—We learn from the Secretary of this Institution (Mr. T. Cole) that the annual general meeting, for the election of officers and members, will take place on the 26th inst.

Southern District Association of Gas Engineers and Managers—The annual meeting of this Association will take place at the Holborn Restaurant next Thursday, when additional names will be submitted for placing upon the roll, and the President (Mr. R. Beynon, of Torquay) will deliver his Inaugural Address. At the close of the business, the members will, as usual at this meeting, dine together.

British Association of Water-Works Engineers.—A general meeting of this Association will be held at the Westminster Palace Hotel next Saturday, under the presidency of Mr. H. Ashton Hill, M.Inst.C.E. We learn from the circular issued by the Secretary (Mr. W. H. Brothers) that certain alterations will be proposed in the rules, and that Mr. H. W. Pearson, M.Inst. C.E., the Engineer of the Bristol Water Company, will read a paper entitled: "Springs and Wells for Town Supplies, and Works in Connection with Same."

Abridgments of Specifications.—Among the Abridgments of Specifications lately issued by the Patent Office, attention may be called to three which have special interest for our readers. They cover the period from 1889 to 1892, and comprise (1) air and gas engines, (2) coin-freed and similar apparatus, and (3) appliances for distilling, concentrating, evaporating, and condensing liquids. The abridgments in the first volume relate to engines worked by compressed air, furnace gas, ordinary gas, petroleum, hot air, and vacuum; those in the second volume include automatic gas and liquid meters; and those in the third, apparatus for the treatment of ammoniacal liquor, the distillation of tar, &c. It is pointed out in an "Explanatory Note" that the abridgments are merely intended to serve as guides to the specifications, which, of course, would have to be consulted for details; but the volumes form useful records of the progress of invention during stated periods, and present a great deal of information in a convenient shape for reference—search being facilitated by subject-matter and name indices.

TECHNICAL RECORD.

CHEMICAL PROCESSES IN GAS-WORKS.

(*Concluded from p.* 229.)

The chemical composition of several varieties of illuminating gas is shown in the following table. The first three columns give the effect of variations in the temperature of carbonization on the gas made from the same sample of coal. It is evident that the illuminating power of the gas fluctuates by about 20 per cent. Rising from a medium-red heat, the illuminating power of the gas gradually decreases, the percentage of hydrogen increases, and the proportion of methane and heavy hydrocarbons diminishes. The other constituents do not vary much. The specific gravity falls with the rise of temperature in complete correspondence with the illuminating power, and with the amount of air required for the consumption of the gas. In practice, the effect of carbonizing coal at very high temperatures may generally be observed on Mondays. The retorts usually are not charged on Sunday; and hence there is not the customary abstraction of heat from them for the carbonization of the coal, and they are at a very high temperature when carbonizing begins on the following day. The gas then produced is very poor, and needs much enrichment. By extremely high heats, it is thus possible to make gas of only 3 to 5 candle power from cannel.

The next five columns show the composition of gases arranged in the order of ascending illuminating power, but obtained from completely different materials. Column 4 refers to gas from excellent Saar coal, such as is carbonized exclusively in many towns of South Germany. Column 5 shows the heavy gas supplied at Frankfort-on-Maine. It is produced by the carbonization of about equal proportions of German coal, Scotch cannel, and Australian boghead shale. It is quite a special product, of very high illuminating power, and suitable for consumption only in small fishtail burners, in which it gives a flame of about 12-candle power. Other towns which were supplied with similar rich gas are now having coal gas substituted for it, either wholly or partially. Column 6 shows cannel gas from Scotch cannel; column 7, gas from Australian boghead shale, such as is used at Frankfort; and column 8, oil gas produced from oil obtained at Messel, near Darmstadt. These three gases are used for the enrichment of coal gas. The columns 4 to 8 also show clearly the rise in specific gravity, and in the quantity of air required for combustion, which accompanies increase in illuminating power. The calorific value rises also, but to a much lower degree. For instance, a rise from 15 to 34 candles is attended by an increase in calorific value in the ratio of 5 to 7 only.

—	Gas from the Same Coal Carbonized at Different Heats.			Coal Gas.	Frankfort Gas.	Cannel Gas.	Gas from Australian Shale.	Oil Gas.	Gas with 3 p. Cent of Air.	Gas from Brown Coal or Lignite.	Carburetted Water Gas.	Gas from Coke-Ovens.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Hydrogen . . . . . per cent	54·300	51·300	48·500	49·400	33·900	30·700	21·800	14·600	48·000	41·000	34·800	48·900
Methane . . . . . ,,	30·200	31·300	33·400	32·400	42·700	44·400	48·900	48·800	31·900	14·900	21·000	26·200
Hydrocarbons . . . . . ,,	3·200	3·900	4·400	4·500	12·700	15·500	22·200	33·100	4·700	4·800	13·200	3·400
Carbonic oxide . . . . . ,,	8·800	8·000	8·600	8·600	5·800	5·500	4·600	2·300	8·000	25·800	21·800	8·400
Carbonic acid . . . . . ,,	2·200	1·800	2·200	2·300	2·500	2·400	2·000	1·200	2·100	0·800	4·200	3·600
Oxygen . . . . . ,,	0·300	0·200	..	..	..	..	0·200	..	0·400	..	0·800	0·400
Nitrogen (residue) . . . . ,,	1·000	3·500	2·900	2·800	2·400	1·500	0·300	..	4·900	12·800	4·200	9·100
Specific gravity of the gas	0·399	0·440	0·463	0·470	0·550	0·560	0·610	0·750	0·480	0·490	0·750	..
Illuminating power, calculated to 5 cubic feet per hour consumption, in candles	10·700	11·700	13·380	14·160	32·090	35·870	45·310	61·350	16·050	..	22·650	..
Actual rate of consumption (in bats-wing burner), in cubic feet . . .	4·485	4·485	4·485	5·297	5·297	5·297	5·297	5·297	5·297	..	5·297	..
Cubic feet of air required for the consumption of 5 cubic feet of gas. .	4·930	5·750	6·080	4·910	7·220	7·640	8·680	10·140	4·940	4·010	..	..

Coal gas is enriched at Hamburg to the extent of about 3 candles, by means of cannel gas, which is produced in separate retorts, in order that the inferior coke from the cannel may not deteriorate the good coke from the coal. The different varieties of cannel vary much in quality; and hence the quantity required to give the desired result varies greatly. For example, less Lesmahagow than Arniston cannel is needed. Unfortunately, cannels frequently contain very much sulphur. Enrichment by oil gas has not yet been introduced in German towns, though it might prove successful in places near the Thuringian Oil-Works or Messel. The Thuringian oil resembles the Scotch shale oil, which has given such good results by the Peebles oil-gas process. At Huddersfield, special advantage is claimed for the admixture with hot oil gas of about 15 per cent. of oxygen, which is produced on the spot. According to the author's researches, oxygen is precisely the most unfavourable addition that could be made, as it straightway destroys the illuminating power of a flame. Air acts more favourably, and coal gas very much more favourably, than oxygen. The introduction of coal gas into the oil-gas hydraulic main, as is practised at Peebles and Galashiels, results in the production of more and better gas, as the coal gas becomes saturated with hydrocarbons which otherwise would be deposited in the tar. Of course, it is possible the effect of oxygen in deteriorating the light is partly balanced by the higher proportion of hydrocarbons; but in the mixed gas the small quantity of added oxygen must be practically of no effect.

These enrichment processes depend on the mixture of a rich with a poor gas; but the same effect, as determined by the photometer, may be achieved by merely increasing the amount of the hydrocarbons in the poor gas. An apparatus for carrying out such a plan has been employed in houses for some years, in certain towns; but it occasioned risk of fire. The system has recently been adopted in gas-works, thanks in no small measure to the endeavours of Dr. Bunte in 1893, when 90 per cent. benzol was at a very low price. This benzol was the most suitable agent; but speculation and the adoption of the system by several large gas-works, rapidly raised the price from about 15s. to 60s. per cwt., and benzol for a time had to be given up as a carburetting medium. The price has since fallen to such an extent that its use is again profitable.

In Hamburg, cannel is comparatively cheap, and a little rise in the value of benzol makes the former the cheaper enriching agent. But in inland towns cannel is dear; and benzol can rise considerably in price before it would be the more expensive enriching medium. Favourable contracts for benzol have rendered its use possible at Hamburg for almost a year; and it has proved of great service. In the summer months, an apparatus constructed by the Berlin-Anhalt Machinery Company was used. A part of the stream of gas was deflected through the apparatus, in which the benzol was vaporized, and was afterwards returned to the main stream. But the capacity of the apparatus did not suffice for the autumn and winter months; and the benzol was then merely vaporized by steam at 212° to 221° Fahr., and the vapour was injected into the main. This method answered very well on one works, with a maximum make of about 4¼ million cubic feet. During the cold weather the enrichment proved more permanent than that effected by cannel. The gas was raised from 15 or 16 Hefner-units power to 19·5 Hefner-units power—or, say, from 13·6 to 17·1 (English) candle power—at an expenditure of from 5244 to 6991 grains of benzol per 1000 cubic feet. This is almost exactly equivalent to 1500 to 2000 grains of benzol per 1000 cubic feet per (English) candle. The quantity of benzol required was observed to vary between the limits stated. Experiments with petroleum-benzine or benzoline have shown that it also answered well; but for the same illuminating power about four times as much benzoline as benzol had to be used. Benzoline being subject to the German duty on petroleum, proved far too costly for use in Hamburg. After the rise in the price of benzol, the residues from the oil-gas compressors in railway works, and other carburetting agents, were tried experimentally.

Carburetted water gas has not yet been introduced in German works. The duty on petroleum would raise the price of Russian Solar oil delivered at Hamburg to more than double the figure at which it could be delivered there duty free. The use of petroleum oils appears out of the question; but the oils from Thuringia and Messel might be used in some German towns. The author learnt at Brussels that the German oils were more easily gasified, and gave higher results than did American petroleum. These oils are cheaper than petroleum in Germany; but at current prices coal gas of (say) 17-candle power can be produced more cheaply than the same quality of carburetted water gas. But at the prices of coal in 1891-92, or the average rates of the last ten years, coal gas is the dearer. Carburetted water gas in Germany must depend on its numerous other advantages, rather than on its cheapness. These advantages are so substantial, that negotiations are pending for its introduction at Hamburg; while a considerable extension of the coal-gas plant is also contemplated. The water-gas question falls peculiarly within the scope of the chemist's labours.

The foregoing review of a chemist's labour in a gas-works, indicates that there is an ample field for him in connection therewith, and that gas manufacture is one of the most interesting branches of chemical technology.

Midland Association of Gas Managers.—We learn from the Secretary of this Association (Mr. C. Meiklejohn, of Rugby) that the annual general meeting will be held in Birmingham on the 24th inst.

REGISTER OF PATENTS.

Storing Acetylene.—Claude, G., of St. Mandé, and Hess, A., of Paris. No. 29,750; Dec. 24, 1896. Date claimed under International Convention, June 30, 1896.

This invention relates to the storing of acetylene in a small volume, in order that it may be supplied in portable form to the consumer; and it consists in dissolving the gas under pressure in certain liquids—the effect of the pressure being to increase the solubility of the acetylene, and so enable a considerable quantity to be stored in a small volume.

Liquefied acetylene, the patentees point out, occupies the least volume; but the pressure is very high, and may become excessive should the critical temperature of acetylene (37·5° C.) be accidentally exceeded. On the other hand, simple compression of the gas enables dangerous pressures to be avoided; but the quantity which can be stored in this way is too small. For these reasons, they avail themselves "of the great solubility of acetylene in certain liquids, and increase this solubility by pressure." This is the invention which they broadly claim "whatever may be the liquid employed, the kind of apparatus used, or mode of operation."

As examples of the liquids referred to, may be mentioned methylic, ethylic, amylic, and other alcohols, acetic acid, benzene, toluene, xylene, &c. Certain of these liquids dissolve, according to the conditions of temperature, from four to upwards of six times their volume of acetylene at the ordinary pressure; and this solubility increases about as the pressure. There are, however, certain well-defined chemical groups of substances which are unsuitable for the purpose, owing to absence or insufficiency of their solvent power—such as the primary, secondary, and tertiary amines of the fatty series, as well as phosphines and arsenious derivatives.

The bodies which have as yet been found to answer the purpose in practice are comprised in the following groups: (1) In the fatty series: Liquid hydrocarbons, acetylenic hydrocarbons, and their derivatives, alcohols, ethers, the lower members of the acid and oxy-acid aldehydes, and particularly acetones. (2) In the aromatic series: Benzenic hydrocarbons and their derivatives, phenols, aromatic amines. (3) In the higher series: Liquid hydrocarbons and their known derivatives, trimethylene, furfurine, thiophenol, pyrrol, furfurol, essences, &c. (4) Mixtures and combinations of these bodies vary their solvent power.

Valve Mechanism of Gas-Engines.—Toll, J. V., of Twickenham. No. 30,045; Dec. 30, 1896.

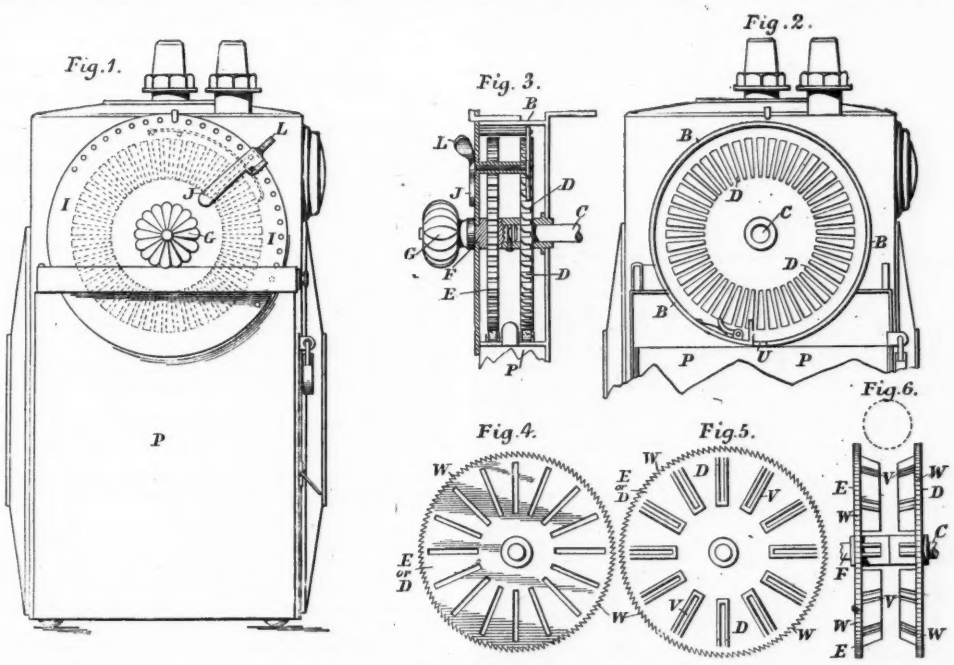
This invention is designed to allow of the gearing being dispensed with which is usually employed to reduce the number of operations of the valve mechanism below that of the revolutions of the engine-shaft. This object is attained by employing an eccentric block, which rotates with the engine-shaft, and in the periphery of which are formed grooves or a divided groove so arranged that at one portion of the periphery there is only a single groove, and at the other portion there are two—the dividing strip of metal preferably terminating at a point at one or both ends. The eccentric block thus arranged operates as a cam as well as an eccentric. The valve—of mushroom type preferred—is controlled by a spring so that it normally remains closed. Between the valve and the eccentric is a rod or its equivalent, which in certain positions will engage with the stem of the valve, and under the operation of the eccentric operate it; while in certain other positions due to the cam portion of the eccentric, the rod is moved clear of the valve-stem, and so does not operate the valve. One end of the rod engages permanently with the groove in the eccentric, and is retained there by a spring—this end being preferably forked so as to obtain a hold upon the block. The operation of the eccentric as it rotates causes the rod to travel axially to and fro, while the operation of the cam groove at certain times causes the other end of the rod to engage with the valve, and at other times to clear it—thus obtaining the results usually secured by means of toothed gearing.

Explosion Engines.—Winton, A., of Cleveland, Ohio, U.S.A. No. 900; Jan. 12, 1897.

This invention relates more especially to gasoline engines, though some parts of the mechanism are adapted for use in other forms of explosive engines. One object aimed at is to provide an explosive engine with mechanism for using the exhaust for the backward stroke of the piston—thus "producing a compounding engine, and a considerable increase in the power and efficiency thereof, and at the same time serve as a muffle for the exhaust to prevent the usual noise therefrom." Another object is to provide an air cylinder for controlling the admission of air and gas, and thereby the force of explosion, power, and speed of the engine. A further object is to provide a feeding arrangement for the gasoline, so as to prevent flooding, and yet always insure an adequate supply of fluid for the working of the engine.

Coin-Freed Gas-Meters.—Glover, R. T. & J. G., of St. John Street, Clerkenwell. No. 2461; Jan. 29, 1897.

The engraving shows details of this invention of "coin-receiving mechanism and its relation to the coin-actuated mechanism of a coin-freed gas-meter." Fig. 1 is a face view of a meter with the price-changer apparatus affixed, and by which, on the adjustment of the face-plate on its suspending hook, the quantity of gas to be supplied for a coin of given value can be determined. Fig. 2 is an inside view of part of a meter, with the face-plate removed and the notched-back coin-receiver wheel exposed. Fig. 3 is an edge elevation of the two coin-receiver wheels, showing the slot-closing shutter with the catch which locks the operative



or back coin-receiver wheel while the coin is being inserted. Fig. 4 represents a face view of a coin-receiver wheel with ratchet teeth on its periphery, and into which a pawl can engage to prevent any back rotation. This wheel may be next the face-plate, or as a back plate, or two such plates may be fitted to the meter for the reception of a coin from the face-plate portion. Fig. 5 is a face view of another form of plate with pockets. Fig. 6 is a side elevation of two of such pocket-plates or wheels, to facilitate a coin being dropped in from above.

In figs. 1, 2, and 3 B is the price-changer casing; C, the spindle operable by the inserted coin in one direction, and in the other by the meter mechanism during the consumption of gas. D is a wheel (with notches in its face) firmly secured to the spindle, one edge of each face tooth being rounded off for the easy insertion of a coin. E is a front wheel secured to the axle F of the turning knob G, but controlled so as to turn in one direction only—the notches being so arranged that, when the pawl is in one of them, another is directly behind the slot of the face-plate I of the price-changer. J is a slot-covering shutter pivoted to the face-plate, but which can be moved over by pressure on the thumb-piece L for uncovering the slot when a coin has to be inserted. The pivot-pin of this shutter has a crook for pressing on a spring pawl, which can enter any of the notches of the back plate or wheel D, to lock it firmly the instant the shutter is moved. This prevents surreptitious tampering with the meter mechanism. A further security against pilfering is secured by a pawl engaging the teeth of the back wheel D, except when great pressure is employed—such as by turning the knob G after placing a coin in the notches of the two wheels D and E. N is a fixed stop, against which the coin strikes, and becomes disengaged from the notches when brought round for delivery into the money-box P, which is formed from the bottom of the price-changer.

The coin, by the position of the slot, has a part projecting from the notches, which bears against the circular part of the casing B, and is moved round to the delivery-hole U; the coin being otherwise securely held slightly aslant in the wheels D E. Instead of the notches being at the edge of the wheel (as fig. 3), they may be formed as slots in the face, (as in fig. 4). This facilitates the ratchet-teeth W being upon the edge for the pawl to engage in, should such a wheel be substituted for either of the notched wheels D or E. The edge ratchet-teeth wheel is also available where pockets V are formed in the adjoining faces of the wheels D E, as at figs. 5 and 6 for the drop insertion of a coin.

An adjustable shutter may be so arranged as to block out any given

number of teeth or slots, so that a second coin cannot be inserted unless the mechanism is moved fully round to discharge the first one. The shutter has openings at the required distance apart, to coincide with the extent of movement to be imparted to the wheel E, according to the value of the coin inserted.

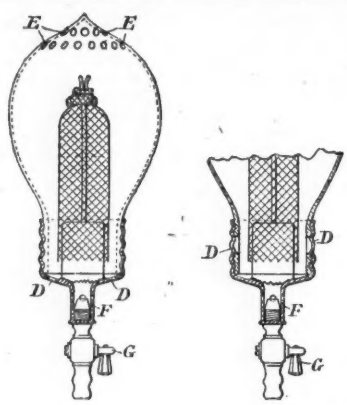
Gas and Petroleum Engines.—Lake, H. H.; a communication from La Société A. Fritscher et Houdry, of Crovins, France. No. 1160; Jan. 15, 1897.

These improvements mainly refer to the connection of the escape valve with the governor, for regulating or controlling purposes; the electric contact arrangement for ignition, by means of an electric spark; the provision of petroleum feeding-vessels, and their combination with a constant level reservoir; the provision of carburetting apparatus, to be employed when the engine is to be worked by petroleum; and the provision of a distributing device for enabling the engine to be operated either with petroleum or with ordinary lighting gas, and (in the latter case) ensuring the admission of the air required to form the explosive mixture.

The engine described in the specification is a four-stroke one, and comprises in its complete state: A driving cylinder with a jacket; a piston connecting to the driving-shaft by a link; a valve for the admission of the explosive mixture, and an exhaust-valve for the escape of the burnt gases; a connection between the exhaust-valve and the governor (the exhaust being cut off whenever the engine exceeds its normal speed); a contact-device for producing the electric igniting spark; a constant level hydrocarbon receiver; a carburizer for carburetting air when the engine is to be operated by petroleum; and a distributing device, enabling the engine to be used (at will) either as a carburetted-air engine or as a gas-engine.

Incandescent Gas-Lamps.—Wolff, L., of Siegburg, Germany. No. 2110; Jan. 26, 1897.

The patentee claims, in the use of incandescent gas-lamps, a closed pear-shaped glass casing or globe arranged around the mantle, replacing the cylinder or bell on the lamp, and provided at suitable places with openings for the inlet and outlet of air—with the object of rendering it possible to imitate or replace electric incandescent lamps by incandescent gas-lamps, in any suitable position which may be given to such lamps.



The glass casing enclosing an incandescent mantle (preferably of pear shape) is attached as shown; the air necessary for combustion passing to the flame in the ordinary manner through openings D provided in the burner or in the holder. These openings may be situated either at the bottom of the holder or at the side. In the latter case, openings must, of course, be provided in the neck of the glass casing, which penetrates into the holder. To allow of the escape of the gases of combustion, small air-openings E are arranged at the top of the glass. These air-openings may be more at the side of the glass, instead of at the top; but it is preferable to place them at the top. The construction of the burner is otherwise quite ordinary. In the engraving, F is the mixing nozzle of the burner; and G, a tap arranged below, and resembling an electric switch.

Acetylene Generator, Condenser, and Holder.—Bean, H. R., of Plaistow, and Ringwood, H., of Poplar. No. 2428; Jan. 29, 1897.

This is a modification of the acetylene plant described in patent No. 28,722 of 1895, whereby the gas, after being generated and passed through the water, is again passed into a narrow condenser surrounding the water-vessel to further cool it, and remove from it any moisture that might remain; and "thus obtain from it the utmost illuminating power."

The patentees' claim is this: In a gas generating and storing apparatus, a chamber or compartment made in, or affixed to, the floating gas-vessel; the lower end of the compartment sealing with the water contained in the outer vessel, and the upper end or opening closed with a suitable door or cover. Also the upper part of the water-vessel or container is formed with an annular space to receive the water displaced by the working of the apparatus; while the outer water-vessel is made with double walls, having a condensing space between.

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1234.—Legge, J. St. Clair, and Cooper, A. S., "Acetylene gas generator." Jan. 17.
1251.—Chandler, S. & J., "Manufacture of gas from oil or other fluids." Jan. 17.
1280.—Gellé, D. I., Tison, A. A., Morel, L. N., and Aubry, J., "Lamp for acetylene gas." Jan. 17.
1289.—Heaton, J., and Thomas, E., "Apparatus for compelling flow of gas by means of currents of liquids." Jan. 17.
1312.—Green, W. R., "Manufacture of illuminating gas." Jan. 17.
1343.—Graham, W. H., "Producing acetylene." A communication from H. Maxim. Jan. 18.
1347.—Bamford, F., and Pollard, J., "Internal combustion engines." Jan. 18.
1363.—Butterworth, E., "Internal combustion engines." Jan. 18.
1370.—Heys, W. G., "Incandescent gas-lamps." A communication from the firm of Jaspisstein and Lemberg. Jan. 18.
1392.—Alexander, A. H., "Storing acetylene." Jan. 18.
1411.—Ragosin, V. T., "Distilling, fractioning, and cracking mineral oils." Jan. 18.
1426.—Hornsby, W., Roberts, D., and Young, J. W., "Internal combustion engines." Jan. 18.
1477.—Kitchen, J. G. A., "Acetylene generating lamps." Jan. 19.
1517.—Lake, H. H., "Producing pressure in vessels or receptacles containing combustible liquids intended for lighting or heating purposes." A communication from La Compagnie Continentale d'Incandescence et de Chauffage. Jan. 19.
1518.—Couturier, E. E., "Gas and petroleum motors." Jan. 19.
1526.—Bezant, A., "Acetylene lamps and generators combined." Jan. 19.
1539.—Gunning, J., "Extinguishing lights after a predetermined time." Jan. 19.
1547.—Gay, J. S., "Gas-lamps." Jan. 19.
1549.—Davison, A. C., and Lucas, H., "Acetylene lamps" Jan. 19.
1559.—Lane, D., "Non-concussion attachment for incandescent gas-burners." Jan. 20.
1562.—Bennett, H., "Oil or gas cooking ovens." Jan. 20.
1568.—Standring, A., "Reflectors for multiple incandescent gas-burners." Jan. 20.
1584.—Thiersant, H. de, and Coulson, W. A., "Production of acetylene gas." Jan. 20.
1609.—Feeny, V. F., "Insulating device for use with incandescent gas-burners." A communication from E. Breslauer. Jan. 20.
1625.—Owens, W., "Manufacture of acetylene gas." Jan. 20.
1641.—Firth, A., "Street gas-lamps." Jan. 21.
1656.—Rowbotham, W., "Generating acetylene gas." Jan. 21.
1665.—Quatannens-Moens, R., and Carreer-Dilger, E., "Producing acetylene gas." Jan. 21.
1709.—Thomas, T. C. J., "Manufacture of incandescent bodies for burners." Jan. 21.
1714.—Hörner, W., "Ventilators for the chimney of incandescent gas and similar lamps." Jan. 21.
1716.—Soolen, C. van, Sternberg, J., and Delgutte, B., "Acetylene lamps." Jan. 21.
1717.—Evans, A. F., "Internal combustion engines." Jan. 21.
1760.—Boult, A. J., "Gas generators." A communication from M. C. Arnot. Jan. 22.
1767.—Macalpine, T., Atterbury, B. J., and The Alcohol Syndicate, Ltd., "Production of copper acetylene." Jan. 22.
1819.—Kelly, J. W., and Roantree, H., "Production of carbide of calcium." Jan. 22.
1893.—Schodt, P. G. de, "Compressing gas." Jan. 24.
1894.—Fallot, L. A., and Delaunay, S. B. E., "Acetylene lamp." Jan. 24.
1920.—Moss, R. J., "Generating acetylene gas." Jan. 24.
1936.—Cuccotti, G., "Gas or vapour engines." Jan. 25.
1983-4-5.—Bower, G., "Manufacture of carbide of calcium." A communication from J. E. Hewes. Jan. 25.
2004.—Sutherland, A. G., and Wright, J. F. & G. E., "Prepayment gas-meters." Jan. 25.
2014.—Hall, J. W., "Internal combustion engines." Jan. 25.
2015.—Crocker, S. H., "Incandescent mantle for gas lighting." Jan. 25.
2078.—Holliday, R., and Holliday, R., & Sons, Limited, "Lamps for acetylene gas." Jan. 26.
2086.—Ricci, C., "Gas and oil motors." Jan. 26.
2094.—Windham, F., "Gas-lamps." Jan. 26.
2105.—Rathbone, J. J., "Rotary engine or liquid meter." Jan. 26.
2131.—Schodt, P. G. de, "Incandescent gas lighting apparatus." Jan. 26.
2149.—Stubbs, G., "Automatic gas disconnector." Jan. 27.
2169.—Beech, E. W., and Melhuish, A. G., "Gas cooking and heating stoves." Jan. 27.
2174.—Goodwin, J. S., "Acetylene generating apparatus." Jan. 27.
2175.—Ohlhaver, H. P. D., "Mantles for incandescent gas-burners." Jan. 27.
2200.—Myers, T., "Heating igniters of gas-engines." Jan. 27.
2260.—Rose, A., "Acetylene gas-burner." Jan. 28.
2288.—Sugg, D. W., "Incandescent gas-burners." Jan. 28.
2309.—Jacobi, G., "Acetylene gas apparatus." Jan. 28.
2312.—Jürgens, J. F. C., "Automatic gas-igniting devices for incandescence and other gas-lamps." Jan. 28.
2365.—Léry, J. B. de, "Burners for incandescence gas lighting." Jan. 29.
2366.—Worsnop, C. H., and Barraclough, J. H., "A self-cleaning gas-burner, mostly for acetylene gas." Jan. 29.
2395.—Nobes, G., and Tilley, T. H., "Automatically shutting off the supply of gas in case of fire." Jan. 29.
2415.—Maxim, H., and Graham, W. H., "Manufacture of calcium carbide." Jan. 29.

Dorchester Gas-Fitting Company, Limited.—The profits realized by this Company in the twelve months ending Dec. 31 last enable the Directors to recommend, at the annual meeting to-day, a dividend of 9d. per share (being equal to 11 per cent.), and carry forward £137.

Fixing Cookers and Inspecting Fittings at Salford.—The Gas Committee of the Salford Corporation have decided to fix gas cooking-ranges without charge; and it is intended to lend and fix free grillers and pre-payment meters for use in the cooking of meals in cottages. In order that the quality of the gas may not suffer owing to the use of defective fittings, it has been arranged that, on payment of a nominal fee of 1s., a competent inspector shall be sent to examine those of any consumer who desires it, and report to him on any imperfections.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Sulphate of Ammonia as a Manure.

SIR,—The article in your last issue, entitled "The Sulphate of Ammonia Committee at Work," brings prominently before manufacturers of this product the efforts which have been quietly in progress to raise sulphate to its proper place for manurial purposes in the agricultural world.

The results you publish of the experiments made at Dalmeny Park, Edinburgh, under the auspices of Lord Rosebery, are most useful. The value of experiments such as these, made under such impartial and unbiassed conditions, cannot be too highly estimated. The complete tabulated results, with scientific notes and explanations by Mr. John Hunter, which Mr. Drysdale (Lord Rosebery's representative) promises will be a further valuable contribution to this important subject.

If I rightly understand the experiments as reported, they represent the net profit of using the mixtures, as compared with unmanured plots. In the hay experiments—where two-thirds of sulphate of ammonia, and one-third of superphosphate were used—this profit is represented as being £1·55; and in the following experiment—where two-thirds of nitrate of soda was used, and one-third of superphosphate—the profit was £1·46, which is an increase of about 6 per cent. for the sulphate over the nitrate. The hay grown with sulphate of ammonia is reported to be immensely superior in percentage of albuminoid nitrogen, to that grown with nitrate of soda. With a mixture of only 40 per cent. of sulphate, 40 per cent. of kainit, and 20 per cent. of superphosphate, the profit is represented as being £1·36, or 12 per cent. less than in the first experiment containing two-thirds of sulphate. In the fourth experiment described—sulphate of ammonia only being used—the profit is shown as £1·35, which is 13 per cent. less than in the first experiment, containing the addition of superphosphate.

In the potato experiments, sulphate of ammonia gave better results in every case than the nitrate of soda.

Turning to the turnip experiments, I find that where one-eleventh of sulphate of ammonia was used, the profit was £2·38 per acre; and with one-ninth of nitrate of soda, the profit was but £1·58 per acre—showing the sulphate profit to be 50 per cent. more than the nitrate. With a mixture containing only 8 per cent. of sulphate of ammonia, the profit is still further advanced; while the result of the experiments shows that the most profitable manuring is a mixture of sulphate of ammonia, superphosphate, and lime compost. Further the analyses of the turnips showed that those grown with sulphate of ammonia and lime compost were much superior in albuminoid nitrogen to those grown with nitrate of soda. These turnip experiments confirm those made in connection with the West Lothian Agricultural Society, concerning which you published information recently. In these cases, the weight of swedes produced per acre equalled 26 per cent. more by the use of sulphate of ammonia mixed with farmyard manure and other fertilizers (not compounds nor nitrate of soda), than with the land which was unmanured; and in the case of the yellow turnips, 24 per cent. increase was obtained.

In the Dalmeny experiments it will be noted that sulphate of ammonia and nitrate of soda have both been based upon a market price of £8 per ton. The experiments all tend to show that the general rule of considering nitrate of soda as being 25 per cent. less value than sulphate of ammonia, apart altogether from the increased cost for carriage and handling, is not nearly sufficient, and that the nitrogenous value must not be compared alone.

With a gradually improving market, there is danger of resting satisfied with what has been accomplished. Such articles and information as you publish from time to time are the best possible stimulus to effort, and keeping alive the interest of sulphate manufacturers in so important a matter. Continuous advertising and experiment will eventually demonstrate the superiority of sulphate of ammonia as compared with other manures, and also the most desirable kind of mixtures for different soils and produce. The £750 worth of prizes already offered by the Committee to Agricultural Societies, together with the £500 prize for an essay upon the subject, are likely to create a considerable amount of competition and concentration of thought upon the subject.

To the energetic Chairman of the Sulphate of Ammonia Committee, Mr. W. G. Blagden, and to Colonel Sadler, of Middlesbrough, the thanks of all sulphate of ammonia manufacturers are due, for their energy and perseverance in the cause they have so thoroughly undertaken.

EDWARD A. HARMAN.

Huddersfield, Feb. 4, 1898.

Electric Lighting and Carburetted Water Gas in Edinburgh.

SIR,—Your Scottish Correspondent is usually so fair, and shows such a grasp of what is going on in the electrical world, that I am a little disappointed at his remarks in the last number of the "JOURNAL" concerning the electric lighting of Edinburgh streets. I am sure he will forgive me for pointing out how this matter really stands. In the present year's estimates for lighting there is a sum of £8605 for arc lamps lighting certain streets at the rate of £16 per lamp per annum, which includes all charges—interest on capital, sinking fund, carbons, trimming, and maintenance, as well as the actual current. The saving to the Lighting Department through the disuse of the gas-lamps displaced, not only in gas, but in attendance, maintenance, &c., is calculated at £3400; thus making the actual increase £5205. Of the above sum of £8605 received by the Electric Lighting Committee for public lighting, about one-half is spent on interest, sinking fund, carbons, trimming, and maintenance. What they get for the actual current is a little over 1¼d. per unit, which includes the proportion of all station charges, rent, rates, taxes, and Town Clerk's Department. In short, instead of the public lighting being a help, in a direct financial direction, to the Electric Light Department, it is the other way; but there are other considerations which make it very advantageous to the undertaking. The net average amount received per unit for private lighting, at present rates, is 3·6d.; and for public lighting, about 1·65d. Your correspondent will see from these figures that there can be no financial juggling to help the Electric Light Department at the expense of the ratepayers. Moreover, the undertaking has already, during the two completed years of its existence, paid over to the rates about £7000; and at the end of the current financial year it will hand over other £3000.

I do not wish to go into the municipal expenditure on electric light for private lighting as distinguished from street lighting. It is really a comparatively small affair—probably about £500, which will not appreciably affect the Electric Light Department up or down, and cannot be any burden on the rates or Common Good, because it is at present prices rather cheaper than gas.

May I venture to say that I quite agree with your correspondent in his views as to the carburetted water-gas process being introduced into Edinburgh. I am quite sure, from what has come to my knowledge, that it has greatly checked the increasing use of gas for cooking and heating. I hope the whole thing will be thrown on to the scrap heap.

A. DONALD MACKENZIE,
Chairman, Edinburgh Corporation Electric Light Committee.

Feb. 5, 1898.

Gaseous Firing and Stopped Ascension-Pipes.

SIR,—In reply to "Country-Manager's" letters *re* stopped ascension-pipes (*ante*, pp. 30, 130), I am of opinion that he would improve the working of his settings if he reduced the weight and duration of each charge. I prefer to work light four-hour to heavy six-hour charges. The make per ton is considerably increased, and stopped pipes are not so prevalent. I am not troubled with stopped pipes, except on one or two retorts, and this I know to be caused by defective ascension-pipes. If I used a hydraulic main, I should prefer much less than 1-inch seal; but I have a dry main and valves, the use of which give me no trouble.

With reference to the fuel account, this greatly depends on the way the furnaces can be worked. For instance, if a setting of six were charged six times every 24 hours, seven of these charges would be required for the producer; but if the circumstances were such that some of the charges had to be missed, the number required in the producer would probably remain the same.

One would think that the result obtained by "Country Manager" would not be high enough to enable him to get the full benefits to be derived from gas-fired settings.

PERCY H. FLETCHER.

Evesham, Feb. 5, 1898.

Sales of Shares.—Mr. R. Saunders recently disposed of £200 of original stock of the Brighton and Hove General Gas Company, carrying dividends at the rate of 11½ per cent., in four lots of £50 each. The first and second lots realized £170 each, while the remaining two fetched £165 apiece. Some £20 shares in the Eastbourne Water Company have lately been offered for sale in lots of five. All the shares, which are entitled to a dividend not exceeding 7 per cent. per annum, were disposed of at par, with the exception of one of the earlier lots, which was knocked down at the rate of £26 per share. At Devonport yesterday week, 30 guaranteed shares in the Devonport Gas Company were sold in lots at from £7 10s. to £7 12s. 6d. per share.

New Joint-Stock Companies.—The Delacroix Motor Syndicate, Limited, with a capital of £60,000, in £1 shares, will, among other things, carry on business as manufacturers of, and dealers in, all kinds of apparatus capable of being used in connection with the ignition of gas. The Birmingham Carbide Company, Limited, with a capital of £25,000, in £1 shares, has been formed to enter into an agreement with the Thornton-Scarth Automatic Lighting Syndicate, Limited, and to manufacture and deal in carbide of calcium and all kinds of chemical substances. Under the title of David Thom, Domeier, and Co., Limited, a Company has been formed to acquire and extend the old-established businesses of Messrs. David Thom and Co, of Pendleton, Manchester, and Messrs. Domeier and Co., of St. Mary-at-Hill, E.C., manufacturers of soap, glycerine, oil, tallow, chemicals, &c. The share capital is to be £180,000, divided into 18,000 6 per cent. cumulative preference shares of £5 each, and 18,000 ordinary shares of similar nominal value. The first issue will consist of 16,000 shares of each class.

Meters Limited.—The statutory meeting of Meters Limited was held in the Memorial Hall, Albert Square, Manchester, on Thursday. Alderman Miles, Chairman of the Directors, who presided, explained that the Company was registered in October last, having been formed for the purpose of acquiring certain properties and patent rights relating to gas-meters. The combined businesses of the Company at the present time continued to be prosperous. The Directors had made an inspection of the various works, and were satisfied that the Company were in possession of premises and businesses of a thoroughly satisfactory and effective kind, and that the purchase had been one of solid assets, and not merely prospective ones. The members of the various firms who formed the amalgamation, and the Directors themselves, had voluntarily invested in the Company to the extent of £74,805, which was a substantial guarantee of their interest in its future welfare. The promoters of the Company had consented to take out of the sum to be paid to them in shares a block amounting to 50,000, and had agreed that these should not rank for dividend unless the remainder of the ordinary shares received 7 per cent.

The Land for the Newcastle Gas-Works Extensions.—From Tuesday to Thursday last week, Mr. C. Oakley was engaged, at the County Hotel, Newcastle, as Umpire in arbitration proceedings, instituted under the Newcastle and Gateshead Gas Act, 1896, and the Lands Clauses Act, to determine the amount to be paid by the Newcastle Gas Company to the Corporation for certain land which they wish to acquire compulsorily for the purpose of extending their works. The land in question is partly in Newcastle and partly in Walker; the portion situated in the former belonging to Lord Northbourne, and that in the latter to the Corporation. It is stated that terms have been satisfactorily arranged with his Lordship's Agents; but difficulty has arisen with the municipal owners. The difference between the parties as to the value of the land—£40,000 on one side and £8000 on the other—is a wide one. The case for the Corporation was conducted by Mr. Balfour Browne, Q.C., and Mr. H. F. Manisty; that for the Company by Mr. Cripps, Q.C., and Mr. Leigh Clare. The Corporation based their figure on the increasing value of the land in the district; while the Company contended that it would cost so much to remove the tank waste, &c., on the land that its value would be pretty well absorbed. The Umpire has reserved his award.

PARLIAMENTARY INTELLIGENCE.

PRIVATE BILLS (SESSION 1898).

Opposition on Standing Orders.

In the "JOURNAL" last week it was mentioned that the memorial complaining of non-compliance with Standing Orders in the case of the petition for the Filey Water and Gas Bill had been under consideration by one of the Examiners (Mr. Thoms). One of the allegations was that, though it was proposed by the Bill to raise the rates for water for domestic purposes, notice of such intention had not been given. After hearing the arguments, the Examiner decided that the Standing Orders had not been complied with.

Mr. Thoms has also been considering the allegations of non-compliance in respect of the petition for the Newhaven and Seaford Water Bill. The memorialists were the Newhaven and Seaford Water Company and certain residents and ratepayers in the neighbourhood; and their case was presented by Mr. H. W. Cripps. An important allegation was that the promoters—the Newhaven and Seaford Urban District Councils—sought to appropriate the Company under the Arbitration Act of 1889 instead of under the Land Clauses Consolidation Act, which gave the Company more favourable terms. It was also proposed to prohibit the arbitrator from giving compensation for works commenced and expenditure incurred since July 15, 1897; whereas the Company had spent, and were still spending, money on their works. The notice of the Bill did not state this prohibition as one of its objects. The promoters also purposed extinguishing without compensation the shareholders' statutory right to arrears of dividend; and they suggested that compensation should not be awarded for more than the previous six years' arrears. He submitted that the notices were bad and misleading; that the two provisos in the Bill were not included in the notices; and that the Arbitration Act, 1889, was not mentioned in the notices, as it should have been. It was contended by Mr. Rodgers, for the promoters, that the objections raised by Mr. Cripps referred to merely subsidiary and consequential matters. They could not put the whole of the Bill in the notices; and he denied Mr. Cripps's contention that they were going to exclude the Lands Clauses Act. What they proposed to do was to deprive the Company of their undertaking; and they intended to show Parliament that the promoters should do this under very special terms. Mr. Cripps said the terms were so very "special" that they did not appear in any other Act of Parliament. They proposed to buy the undertaking, and give for one part less than the ordinary value, and for two parts nothing at all. The Examiner thought the Arbitration Act should have been mentioned in the notices; and he sustained the allegation. A number of other objections were raised, and in most cases sustained.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Tuesday, Feb. 1.

(*Before Mr. Justice* NORTH.)

Jordeson v. Sutton, Southcoates, and Drypool Gas Company and Others.

This was an action brought by Mr. Jordeson, a solicitor, for damages for injury to certain house property owned by him in Clyde Terrace, Hull. The defendants are the owners of a piece of land on the south side of the terrace, and they, by their Contractors, Messrs. Holme and King, are constructing a gasholder having a diameter of 160 feet. To do this, they were making a circular trench with projecting piers for the purpose of receiving the foundations for the holder; and the ground in the centre of the trench was also excavated. The plaintiff alleged that his houses were built in 1866, and therefore were "ancient" before the defendants' works were commenced; and he complained of the withdrawal of the support to which his property was entitled by prescription. He also asked for an injunction to restrain the defendants from erecting a gasholder to such a height as would interfere with the access of light and air to his houses. The defendants said they had not been negligent in the carrying out of their works, and that they did not interfere with the plaintiff's ancient lights—in the first place, because he had no ancient lights; and, secondly, if he had, the gasholder would not interfere with them. The matter had previously been before his Lordship on a motion for an injunction to restrain the defendants from proceeding with the work; but it was not granted.*

Mr. UPJOHN, Q.C., and Mr. RUSSELL appeared for the plaintiff; Mr. HALDANE, Q.C., Mr. MACNAGHTEN, Q.C., and Mr. BOOME, for the Gas Company; and Mr. RAWLINS, Q.C., and Mr. SCOTT for the Contractors.

Evidence was given by two Engineers well acquainted with the strata of Hull, who stated that a bed of running silt had to be got through before the depth required for the foundations of the holder would be reached. In order to prevent subsidence, it was necessary to use a system of consecutive planking in excavating; whereas the defendants employed a straight face of timber from the ground level to the bottom. It was stated that the existence of buildings near the excavation made this a very risky operation.

Wednesday, Feb. 2.

Mr. *Charles Hunt*, M.Inst.C.E., was called this morning, and, in answer to Mr. UPJOHN, said he had superintended the construction of gasholder tanks in different parts of the United Kingdom; and two very large holders were constructed from his plans at Birmingham. He had inspected the site of the defendants' tank, and had noticed damage to the plaintiff's houses. Early in September last year, he saw cracks in the ground, indicating that the foundations had come forward towards the gas-works. The brickwork was cracked, and the outbuildings had come away from the main ones. He was speaking of the houses next to the excavation. There was a settlement of the ground in the direction of the trench; and he came to the conclusion that silt had been drawn out. Assuming an excavation had to be made to the depth of 36 feet through the strata of Hull, special precautions should be taken to deal with the running silt met with in the course of the work, to prevent it falling into the trench. He had had to superintend works in soil as bad as, if not worse than, that at Hull. He thought it was considerably worse at Windsor Street, Birmingham, where he had to deal with running sand and silt.

Mr. UPJOHN: What, in your opinion, are the precautions which ought to be taken to deal with this running silt?

Witness: I consider that the timbering should be executed in frames, so as to be perfectly independent one of the other, and the runner should be driven through the running silt. I adopted this method at Birmingham, and in other places. It is a well-known one, and is always employed by an engineer or contractor where he knows he has to deal with running silt or water in an excavation.

Examination continued: He was using this method in works now in progress. In his experience, he had found it effectual for excluding water from the trench sufficiently to prevent damage to the surrounding land. In the Birmingham works, there had been a slight settlement; but it was confined to a yard or two from the outside of the trench. They were building close to the public road, and no settlement had occurred there. The trench was 51 feet deep, and the tanks were 240 feet in diameter. They were the largest in existence at the time of their construction. The two tanks adjoined each other. It would not have been prudent on the part of the defendants to excavate the trench without making some arrangement for dealing with the water coming into it. The defendants' system was not reasonably sufficient for dealing with the water, and it would not keep the water back behind the timber so effectually as the one he used at Birmingham. He thought it was most inadvisable for the defendants to employ the method they had adopted. So far as his experience went, it was not the ordinary or customary plan of dealing with soil such as that at Hull; and he should only adopt it when the ground was dry. He should call it unsuitable.

In cross-examination by Mr. MACNAGHTEN, witness said he had only adopted the defendants' system in shallow trenches of 14 feet. At Birmingham, when they went down more than 50 feet they did not find solid ground; they kept the pumps going day and night. The purifier-houses, which were strongly built, were only 8 or 10 yards away. The damage to the houses at Hull was such as would occur after removal of silt. The withdrawal of water would not lead to the same result. During the progress of the Birmingham works, they drained the wells for a considerable distance round; but no accident happened.

Mr. *J. Bilson*, an architect and surveyor of Hull, described what he saw in the trenches on four occasions when he visited the defendants' works. He said the brickwork had been commenced, but water was coming in at the horizontal joints in the timbering just below the silt stratum. The planks were 7 inches wide and 2½ inches thick. The upper planks were from 17 to 20 feet long, and the lower ones were about 4 or 5 feet long. The defendants were pumping to relieve the trench of water. None of the joints in the timbering were caulked. He thought that the lower runners had not been placed in position by driving, but that when the trench had been excavated the planks were fitted in. They were very uneven. He had made eight inspections of the plaintiff's houses, and had measured some of them. They were from 2 to 3 inches out of plumb—the lean-over getting worse as the excavation proceeded. All the walls dividing the yards of the houses had fallen down except a short one. He had no doubt whatever that this had occurred through the defendants' excavations.

Mr. UPJOHN proceeded to ask witness as to some alleged damage which had occurred to the house of the Manager of the Gas Company.

Justice NORTH (interposing) said it was enough to go into matters which people complained of.

Mr. UPJOHN said he desired to show that there was damage done all round the trench.

Justice NORTH remarked that he did not think the Manager had complained; and he must confine the limits of the action to the houses of the plaintiff. He asked how much worse off those houses would be if they were out of plumb.

Witness replied that a house that was plumb was better than one which was out of plumb.

Justice NORTH: But you do not say the houses are rendered unsafe.

Witness said he did not. In answer to further questions, he stated that a tender had been given for £133 for rebuilding the walls. He had considered the question of whether the light of the houses on the south side of the terrace would be obstructed by the erection of the holder. There was a hoarding 15 feet high on that side, which had been put up by the defendants. It was stated that this was done in March, 1886.

Thursday, Feb. 3.

On the resumption of the proceedings this morning,

Mr. *Bilson* was further examined. He produced a diagram dealing with that part of the case relating to the alleged obstruction of light which would be caused by the holder when erected. He said it was his opinion that the holder when raised to its full height would affect some of the houses on the north side of Clyde Terrace, and most of those on the south side. Assuming the holder to be at a height of 75 feet, there would be substantial obstruction to the light coming to the ground-floor windows on the north side. There would be a difference of 7 feet of the light then as compared with now. If the holder were raised to two-thirds of its proposed height, the interference with the light would still be material; as would be the case with any obstruction over an angle of 45°. This would affect the letting of the plaintiff's houses; and the fact of a gasholder rising in front of the windows must necessarily render the places less desirable for occupation.

In cross-examination by Mr. HALDANE, witness admitted that the neighbourhood of Clyde Terrace was a working-class one. Single families occupied the plaintiff's houses, and the rental was 2s. a week. He estimated the value of the plaintiff's property at £1377; and in doing so, he put it at sixteen years' purchase. This was leaving out of account the damaged condition of the property. When he made his first inspection, he noticed some old cracks in the concrete pavement. The houses were not "jerry" built, but he would not say they were well

* See "JOURNAL," Vol. LXVIII., p. 1295.

constructed. The outbuildings were only half a brick thick, and the main buildings one brick thick. He thought a gasholder of the enormous diameter of that of the defendants would tend to deter people from taking the houses. Questioned at considerable length on the subject of the system of excavation adopted by the defendants' Contractors, witness admitted that the strutting in itself was sufficient, but said the runners allowed the silt to escape from the joints.

Mr. HALDANE stated that the case for the defendants would be that the horizontal joints in the runners were not against the bed of silt, which was covered by long runners.

Witness said he would not swear that this was not so; but he saw water and silt escaping between the joints. The water was dirty.

Mr. *W. A. Gelder*, F.R.I.B.A., an architect and surveyor carrying on business at Hull, said he had had a good deal of experience of foundations in the town, and had inspected the excavation works of the defendants. The vertical timbering was composed of runners. The top one was from 16 to 18 feet long; and below this there were three or four others about 4 or 5 feet in length. He saw some muddy water coming into the trench from between the vertical and horizontal joints of the runners. The latter had been put in very irregularly; and it appeared as if no attempt had been made to keep the silt back. The runners at the point of the silt stratum were as badly put in as they were where the strata were stiffer. He did not know whether or not the Contractors were pumping. He could have put his hand between the vertical joints of some of the runners; and he should think the average space between them would be $\frac{3}{8}$ inch. There had been no effort to make a tight joint. In his opinion the defendants' works were not properly conducted, having regard to the existence of the running silt stratum, and to the fact that other people's property was near. The defendants did not take proper precautions. He had visited the property nine times, and he agreed with Mr. Bilson's statements as to its condition. The settlement of the houses in the direction of the trench was, in his opinion, caused by the excavation for the gasholder. The withdrawal of the silt principally accounted for it. The light of the houses would be very materially obstructed when the holder was at its full height; and they would become untenantable. The comfortable enjoyment of the houses would be very much interfered with; and he did not think they could be let.

In cross-examination, witness said he thought the other property of this class was fairly well let in the neighbourhood, but only two houses on the terrace were let. The gasholder would interfere with the letting. He thought longer runners should have been put in, and the joints caulked. The principal defect in the defendants' system was that they did not have the runners close enough together. He would not swear there was a horizontal joint in the runners at the bed of running silt.

Friday, Feb. 4.

Mr. *P. Broderick*, an architect of Hull, stated that he had had 25 years' experience in dealing with the bed of running silt at Hull. He had seen the defendants' works, and, having regard to the silt there, the method adopted for working was not a proper one. He had examined the plaintiff's property, and he agreed with the other witnesses as to the damage done thereto and as to the cause of the subsidence. Asked his opinion as to the effect of the gasholder, when erected, on the light coming to the windows of the houses, witness said he thought it would materially interfere with it on both the north and south sides of Clyde Terrace, and would also affect the letting and selling value of the property. Without regard to light, he put at £283 the sum necessary to repair the damage already done. If this amount was expended on the property, he did not think the letting value would be depreciated, though it might slightly affect the selling value. He came to the conclusion that the houses had been well built, because they had stood for more than thirty years, and had also borne the strain of the subsidence. He thought the Gas Company should have purchased the plaintiff's property before commencing to erect the holder.

Mr. MACNAGHTEN asked witness if this was not also the view of Mr. Jordeson.

Witness said he did not know. He did not think the plaintiff's property had been affected for residential purposes by reason of the erection of some adjacent tallow-works.

Mr. *A. W. Stanley*, a builder, stated that he erected the houses in question in 1865; and they were all occupied in April, 1866. They were well built, according to the bye-laws then in existence. They were in the same condition now as when he put them up. The neighbourhood was a good one for working people.

Mr. *J. W. Thompson*, the Manager of a joinery business at Hull, said he assisted Mr. Jordeson in the management of the property before July, 1896. He described what happened when defendants began excavating.

Mr. *Jordeson* was called to prove his title. He said he purchased the property for £1700. Before the defendants' excavations were made he had only two houses empty, and now there were eleven on the south side of the terrace which were not fit for habitation. As the excavations went on, the houses became more unfit, and the tenants left every few weeks. He had received complaints as to the state of the houses; and he had not been able to relet them. From his rent-books he calculated that he had lost £77.

This concluded the plaintiff's case.

Mr. HALDANE said he thought it would be convenient, before he called witnesses, if he indicated the points on which he should rely. There was a difference, of course, between the questions of excavation and of obstruction of light. In the first place, the excavation was finished; and if the plaintiff was right, it was a question of damages. His first point was that the defendants were a public Company having statutory duties to supply gas to all within their limits; and they required a holder of the dimensions of the one in course of erection. Secondly, the Legislature gave power to the Company to erect a gasholder, and do all the work incidental to it, on the spot in question, and nowhere else. This contention would bring the Company within the decision in *Truman v. The London, Brighton, and South Coast Railway Company*. Thirdly, in executing their powers, the Company did not act negligently. Fourthly, having regard to the obligations the Company were under, their Act could not release any of the powers or rights to make the works; and consequently no easement could be acquired which would interfere with the execution of their duties. The Company had powers in 1873 to put up the holder on this ground. The fifth proposition was one of fact—whether the Company had a right to drain their own land of water, even though it disturbed the surface of adjacent land; and he contended that they had such right.

Justice NORTH remarked that this might be quite a different thing from taking away silt.

Mr. HALDANE agreed, but said he was bearing that in mind in the evidence he should adduce. He thought perhaps it would be convenient, and might shorten the case, if the Contractors gave their evidence first, as his Lordship would then hear how the excavation was made.

Mr. RAWLINS said his clients were not concerned at all with the alleged obstruction of light. Though they had not an Act of Parliament under which they worked, if the Company established that they had special statutory powers to make the tank, the Contractors would ask for the benefit of it. There was no duty or obligation on their part not to drain the adjoining land; and there could be no negligence where there was no duty.

Justice NORTH: That seems to be a very wide-reaching proposition. It appears to come to this: Where you have a right to do a thing, you have a right to do it negligently.

Mr. RAWLINS urged that there was no negligence in fact. If an act was lawful, the consequences of it could not be unlawful.

Justice NORTH: A man may have a right to shoot over his own land; but if his neighbour were opposite his gun, and he fired, would not that be unlawful?

Mr. RAWLINS replied that they must take the circumstances surrounding the present case; and he should submit, when this was done, that his contention was a correct one.

(*To be continued.*)

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Thursday, Feb. 3.

(*Before Mr. Justice* ROMER *for Mr. Justice* NORTH.)

Livesey v. The Patent Gas Enrichment Syndicate and Others.

This was a motion by the plaintiff (Mr. George Livesey) for an injunction to restrain the defendants, their servants and agents, until the trial or further order, from publishing, printing, circulating, divulging, or parting with certain letters.

Mr. T. TYRRELL, Q.C., represented the plaintiff.

Mr. MICKLEM said he appeared for the defendants; and as they had only received the plaintiff's evidence at six o'clock the preceding evening, he must ask for the motion to stand over.

Justice ROMER said Mr. Micklem should give an undertaking not to publish in the meantime.

Mr. TYRRELL said he must ask for an undertaking in the terms of the notice of motion, otherwise he would have to move *ex parte*.

Mr. MICKLEM said he did not know what that meant. He would undertake not to issue any more circulars, which he thought was all that was complained of.

Mr. TYRRELL said he wanted to restrain the doing of anything with regard to the letters calculated to make persons believe that the plaintiff was connected with the defendant Company. They were letters written by Mr. Livesey, and they were being circulated in a wholly unauthorized manner, to induce persons applying for shares to believe that he was connected with the Company.

After some further discussion,

Justice ROMER thought that an undertaking not to issue the circulars or divulge the contents of the letters should be given for a week.

Mr. MICKLEM remarked that the circulars were issued last year—some 15,000 having been sent out; and, of course, they could not be recalled. But he would undertake not to issue any more for a week.

Justice ROMER thought an undertaking not to issue any more circulars, and not to take any further steps which would indicate that the plaintiff was connected with the Company, would be sufficient.

Mr. MICKLEM agreed to give the undertaking; and the motion thereupon stood over for a week.

Reference was made in the "JOURNAL" last week (p. 236) to the prospectus of the above-named Syndicate, and to the comments thereon by the "Financial News." The following additional remarks appeared last Thursday: "We recently commented on the prospectus of the Patent Gas Enrichment Syndicate. The Board of Directors appeared to consist of two gentlemen, the first of them being Mr. T. Fenwick, of 63 & 64, New Broad Street, E.C.—not unknown in connection with various insurance schemes. The name of Mr. George Livesey was pretty freely used, although the excuse for using it was the fact that Mr. Livesey had declined to join the Board. . . . We believe that the subscription to this flotation has been on a very small scale—so small, in fact, that if we gave the exact figures the public might be sceptical about them. However, instead of stating the facts ourselves, we will merely say that the concern has gone to allotment on a very small subscription, and invite the Directors to say what that subscription was."

The Incandescent Gas-Light Company's Patents.

In the Chancery Division of the High Court of Justice last Saturday, an action brought by the Incandescent Gas-Light Company, Limited, against one Henly, to restrain him from infringing their patents of 1885 and 1886, came before Mr. Justice Romer as a short cause upon motion for judgment in default of defence. Mr. Walter appeared for the Company. Particulars of breaches having been given, his Lordship granted an injunction and an inquiry as to damages. He also made an order for delivery up of the infringing mantles and for payment of costs, as between solicitor and client, up to and including the judgment. The costs of the inquiry as to damages were reserved. In the Queen's Bench Division, on the previous day, Mr. Justice Mathew disposed of a case which had been before him on a previous occasion, and adjourned to allow of the attendance of an expert witness. It was an action brought by the above-named Company to recover damages from the New Incandescent

Mantle Company, Messrs. J. Herbert, Harry Tossell, and Walter Lefrey, for infringement of their patents for incandescent gas-light mantles; and they also sought an injunction to restrain the defendants from further infringing their letters patent. The case against the defendant Tossell was that he was a partner in the New Incandescent Mantle Company, and was connected with other Companies against whom the plaintiffs had obtained injunctions for infringing their patent. Their allegation was that Tossell had in March, 1897, dealt in and sold mantles which were not of the plaintiffs' manufacture. It appeared from the evidence given on behalf of the plaintiffs that the defendant Tossell entered into partnership with a Mr. Dewey in 1896 for the purpose of carrying on business as manufacturers of incandescent gas-fittings and mantle makers, and premises were taken at 31, Jewry Street, E.C. Dewey made the mantles and occupied the first floor; Tossell occupied the ground floor, and supplied burners and fittings. Customers were sent upstairs to get mantles. Dewey deposed that Tossell knew perfectly well that the mantles sold by them were made by him, and that Tossell had sold a number of them to several firms. In his defence, Tossell denied that he had sold mantles to anyone. He said he used some in his shop for lighting purposes, and of these a few were Sunlight mantles; but there were, he admitted, others which were not of the plaintiffs' manufacture. No evidence was called in support of the defence; and his Lordship granted the injunction prayed for, and ordered an inquiry as to the damages sustained by plaintiffs.

Liverpool Corporation and the Water Supply of Prescot—Another Conviction; Judgment in the Meter Case.

At the Prescot Petty Sessions last Tuesday, Mr. H. Mercer, the Hon. Secretary of the Prescot Conservative Club, summoned the Liverpool Corporation for neglecting to furnish a sufficient supply of water to the club premises between Nov. 4 and Jan. 23. Mr. Collingwood Hope, for the plaintiff, stated that, between the dates named, the supply of water at the club had been feeble, intermittent, and insufficient for domestic purposes. He quoted the decision of the Divisional Court in dealing with a similar case some weeks ago, and asked the Bench to inflict the full penalty prescribed by the Act—viz, 40s. per day, or a total for the 81 days mentioned of £162. Evidence was given as to the insufficiency of the supply. Mr. T. Swift, for the defence, submitted that there was no case for a conviction. With the fullest pressure and constant pumping, the Corporation were unable to supply the top storey of the club premises; but there was always an adequate supply for domestic purposes on the ground floor. The Corporation had done everything possible to ensure an ample supply; and he contended that they had complied with the provisions of the Act under which the information was laid. Mr. Parry, the Water Engineer, stated he had never received any complaint about the water supply to the club being insufficient for domestic purposes. After a lengthy consultation in private, the Bench held that a case had been made out. They inflicted a penalty of £2, and a fine of 1s. per day for 59 days—a total amount of £4 19s., together with £5 5s. costs. Mr. Swift applied for a stay of execution, so that the Corporation might consider the desirability of an appeal. This application was granted.

At the Liverpool County Court on Wednesday, his Honour Judge Collier delivered judgment in the case of *Welsby v. The Corporation of Liverpool* (reported last week), in which Mrs. Ann Welsby, a resident in High Street, Prescot, claimed £6 17s. 6d., being the cost of a water-cistern she had been obliged to place in her house in consequence of the alleged defective supply by the Corporation. His Honour said it was provided by section 32 of the Liverpool Water Act of 1866 that the Corporation should furnish a sufficient supply of water for domestic purposes to persons entitled to it, with certain limitations; and in section 37 the Corporation were relieved from the obligation of providing such supply unless the house had a cistern, with a ball and stopcock, and unless such cistern, &c., were kept in good repair. Then came the important proviso on which the plaintiff's claim depended, and which was in the following terms: "Provided that where it becomes necessary to supply such cistern and apparatus to houses erected before the 1st of January, 1866, the expense of and attending the same shall be borne by the Corporation." The house in question was erected before Jan. 1, 1866. Having read the above proviso carefully, he was obliged to confess that he found it hard to say what it meant. Arguments upon its interpretation, it appeared to him, might be almost endless; but whatever words the Legislature, in its wisdom, might have thought proper to use, he could not think that it intended that owners and occupiers of houses should be the judges of the necessity for a cistern and ball-cock, or, in other words, that owners and occupiers should be entitled to supply a cistern whenever they thought proper, and charge the Corporation with the expense. He thought the proviso must be read as if after the word "necessary" the words "in the opinion of the Corporation," or words to a similar effect, had been inserted. The context of the section showed that its object was to limit the obligations of the Corporation in certain cases in which the owner or occupier was in default. The section, in fact, was for the protection of the Corporation; but if the owner or occupier might at his pleasure (for it came to that) supply a cistern at the expense of the Corporation, the obligations of the Corporation, so far from being limited, would be enormously extended. He therefore gave judgment for the defendants. A discussion ensued as to the costs, which were ultimately allowed the defendants. Leave to appeal was also given.

Reductions in Price.—The Directors of the Newmarket Gas Company have decided to reduce the price of gas to ordinary consumers from 3s. 10d. to 3s. 8d., and for gas-engines from 3s. 6d. to 3s. 4d., as from the 1st ult. The Bangor (Co. Down) Town Commissioners have reduced the price of gas from 4s. 2d. to 3s. 9d. per 1000 cubic feet. It was announced at the meeting of the Carmarthen Town Council last Tuesday that the Gas Company had decided to reduce the price of gas from 4s. 2d. to 4s. per 1000 cubic feet for lighting, and from 3s. 8d. to 3s. 6d. for cooking purposes.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of the proprietors of this Company was held at the Offices, Horseferry Road, Westminster, on Friday last, under the presidency of Colonel W. T. Makins.

The Secretary and General Manager (Mr. J. W. Field) read the notice convening the meeting; and the report and accounts—already noticed in the "Journal," *ante*, pp. 181, 232—were taken as read.

The Governor said there were two points in the accounts for the half year under review which called for special notice. They were: First, the small rate of increase in the quantity of gas sold; and, secondly, the continued depression in the market for residuals. These two causes, and these only, had necessitated the large draft upon their reserve fund to provide for their statutory dividend. First, as to their gas sales. The demand for gas was influenced now, more than it used to be, by the character of the weather. Just as the farmers' harvest was good or bad according to the weather at the several seasons of the year, so now, to a great extent, was the gas harvest. In former days, it was all a question of bright weather or dull weather. Now, owing to the ever-increasing number of stoves used for warming houses, the question of temperature had become a very important factor. Unfortunately for their business, though there had been some fog during the last two months of 1897, their character was vastly different from that of the fogs which prevailed in the years between 1880 and 1890. They rarely, if ever, now got a thick black fog, which were so prevalent during those winters. He did not mention this with any regret, but merely from a gas point of view. The explanation was, no doubt, to a large extent to be found in the growing substitution of gas-fires in London for coal-fires; and this also accounted for the fact that their maximum delivery during the past winter was below that of the maximum delivery for 1891—so long ago as that. But the immediate cause of the low rate of increase during the past half year had doubtless been the very high temperature which had ruled, almost without intermission, from the end of September up to the present time. In ten out of the thirteen weeks of the December quarter, the average temperature in London was considerably higher than the mean. On two occasions, the excess over the mean was from 6° to 7°. This state of things did not affect the whole of the half year. Between July 1 and Sept. 30, their gas sales exceeded those for the corresponding three months of 1896 by 6 per cent. But the warm and brilliant weather in the December quarter caused a reduction in the demand; and the December quarter's sales only showed an increase of 0·2 per cent. If the December quarter's sales had been as good as those for the September period, their draft on the reserve fund would have been some £30,000 less. He did not mention the fine weather with regret. It had caused them loss, no doubt; and they must put up with it. It was not anything which could be prevented by foresight on their part; and they must console themselves with the feeling that open weather such as they had had was an untold benefit to many poor people, who were thus able to continue at work, and whose happiness was much deteriorated by a cold and bitter winter. But setting aside the December quarter, and dealing with the whole year, the figures were not unsatisfactory; the increased sales of gas amounting to 4½ per cent.—that was 906 million cubic feet—which was a larger increase than that of 1896 over 1895. Moreover, though their sales of gas for the past two months had been somewhat disappointing, yet the business of the Company continued to extend in every direction. They had added 3300 to their ordinary consumers in the half year; and they had increased the number of automatic consumers by 9700. They had 5000 more stoves let on hire—he was giving round figures—they had sold 2500 stoves, and had let out on hire to their automatic consumers 12,000 additional stoves. Gas-engines had also increased in number by 231; and there had been a small addition of 100 to the number of public lights. The other adverse item to which he had referred—that of residuals—was to be explained, in the first place, by the slackness in the retail coke trade. It was also the result of warm weather, and which had deprived them of some of the advantage derived from their contracts with cement makers, coke merchants, and exporters, which had all been made, as he ventured to predict in August last, at more favourable prices than those in 1896. The increases were: For home consumption, 9s. 6d. against 8s.; and for export, 10s. 3d. against 9s. 3d. However, notwithstanding the falling off in what were called their yard sales, the stocks of coke available for sale during the next two months were smaller than they had been for some years past; and owing to the sustained improvement in their trade, the demand for coke was very good on the part of cement manufacturers. Therefore, so far as coke was concerned, though the yield per ton during the December half year had been poor—being only 1½d. more than in the corresponding period of 1896—they might safely look for some improvement during the current year. Their carburetted water-gas plant at Nine Elms was now in operation; and that at Bromley was approaching completion. They were contracted to be ready for this present winter; but owing to the engineers' strike, there had been considerable difficulty in supplying some portions of the machinery. However, as the winter had been mild, they had not been put to any very serious inconvenience; and they must all rejoice that this labour trouble, the engineering strike, was now at an end. The extension of the carburetted water, or oil-gas system, was most desirable for two reasons: The first was that it reduced the quantity of coke available for sale, which tended to increase the price; and the second was that it reduced the quantity of coal they had to buy, so that any further rise in the price of coal—for which he could see no justification whatever, considering the ever-increasing output year by year—would be partially met by an increased use of oil. Another advantage obtained from this system might shortly be explained by the words "less labour." Fewer men were wanted, and their work did not call for any special qualification; so that the introduction of the oil-gas system into their works had been of two-fold advantage. The next residual which had yielded a low return in the past half year was tar. The two products

which had had bad markets were pitch and anthracene. Pitch was a fluctuating source of income. The price of it to-day was 19s. At the same time last year it was 25s.; while in January, 1896, it was 35s. The reduction in the value from 35s. to 19s. in their make meant a loss to them of £55,000 a year. However, they had seen pitch at 11s. a ton, whence it rose to 40s.; so that they had every reason to expect in the near future there might be some turn in the market in their favour. As regarded anthracene, however, this product did not fluctuate in price, but went steadily down. In 1880, their revenue from this source was, at the then price of 3s. 8d. per unit, £151,000; while last year the amount was £19,000 only. The cause of the decline in the price of anthracene was twofold—the largely increased production, and the substitution of other chemicals for dyeing purposes. Fortunately for them, they had a contract still running at a rather better price than that of to-day, which would help them a little during this half year. On the other hand, in sulphate of ammonia they had to record a distinct and substantial improvement. The lowest price at which they sold was £7 5s. a ton in April last. Their last sales were at £10 per ton; and buyers were becoming more eager. He thought he expressed the hope at one of their recent meetings that the low prices then ruling would induce agriculturists and others to become users of sulphate of ammonia in place of nitrate of soda; and he was glad to find this had turned out to be the case, for, while the estimated production of sulphate in the United Kingdom in 1897 increased by 11,000 tons, the sales increased by 28,000 tons. And while the price of sulphate of ammonia rose 20s. per ton, between January and December, 1897, the price of nitrate of soda fell 6s. 8d. These were figures which he quoted from Messrs. Bradbury and Hirsch's review of the markets during the past year. The outlook for gas companies, therefore, was certainly more cheering. Turning to the expenditure side of the account, he said that beyond the increase of 4d. per ton for coal, they would find that the working expenses had been exactly the same per 1000 cubic feet of gas as in the corresponding period of 1896. One noteworthy feature was the quantity of gas sold per ton, which for the last half year was 9903 cubic feet. This was an additional quantity per ton of 215 cubic feet, which gave, he thought they would agree with him, very good and reliable evidence as to the skilful command of carbonizing on the part of their Engineers.

Mr. GEORGE LIVESEY: Does that include the water-gas portion?

The CHAIRMAN: Yes.

Mr. LIVESEY; Then it is 9900 cubic feet per ton of coal?

The CHAIRMAN: Yes; of gas sold per ton of coal. We must have some facts for arriving at the value.

Mr. LIVESEY: I only wanted to make it clear.

The CHAIRMAN: You do not take exception to the fact?

Mr. LIVESEY: I only wanted to know whether it included water gas, or not.

The CHAIRMAN said perhaps he might mention that they took 75 gallons of oil as an equivalent for a ton of coal. The calculation was made on that basis. The returns of coke, tar, and liquor, made per ton of coal, had been maintained at very satisfactory levels. Before dealing with the net revenue figures, he would tell them how and where the expenditure on capital account had been incurred. For lands acquired, the amount was £167. At Beckton and other stations there had been expended upon cranes, engines, carburettors, &c., £13,000; and upon railway viaduct and waggons, £10,400. These might be taken to be, in the main, labour-saving appliances. Then on retort and purifying houses and fittings they had spent £9900; and on jetty extension and locomotive-sheds, £7000—making a total of £40,300. At Bromley and Nine Elms, on oil-gas buildings and plant in connection with oil-gas manufacture, they had expended £38,100 and £22,000 respectively, or together, £60,100. At Westminster, on new offices and stores, to take the place of the worn-out and disused gasholders, the expenditure was £5000. The new buildings had become absolutely necessary by the extension of their business. At the chemical works, they had expended for sundries £4000; and on sundry buildings and machinery, £5255—a total of £115,655. Then in pipe-laying they had spent, on service-pipes, £24,710, and on mains £12,585—making together £37,295; on gas-meters, £49,472, and on gas-stoves, £34,520. This brought up the total expenditure to £237,429. The Deputy-Governor, he said, had just reminded him, and he would mention it at once, that the cost of the gasholders to which he referred had been written off and charged to revenue, so that they no longer encumbered the capital account. Turning next to the net revenue figures, they found that their charges per 1000 cubic feet of gas for interest on capital, both share and loan, again showed a reduction. In 1894 they were, with a 12 per cent. dividend, 13·81d. per 1000 cubic feet; in 1895, with a 12¾ per cent. dividend, 13·63d.; in 1896, with a 12¾ per cent. dividend, 13·32d.; and in 1897, with a 12¾ per cent. dividend, 12·94d.—a reduction, after allowing for the additional ¾ per cent. dividend now paid, in four years of 1·4d. per 1000 cubic feet. A few comparative figures would, perhaps, enable them to apprehend the cause of the diminished profits of recent years. He would give them the cost of coal and the working expenses and the income from residuals per 1000 cubic feet, for each of the five years 1893 to 1897. In 1893, coals cost 15·94d.; and working expenses 15·95d. In 1894, coals cost 14·39d.; and working expenses, 15·86d. In 1895, coals cost 14·67d.; and working expenses, 15·84. In 1896, coals cost 13·75d.; and working expenses, 16·17d. In 1897, coals cost 13·64d.; and working expenses, 15·81. Therefore there was a reduction of 2·30d. per 1000 cubic feet in the case of coal, and of 2·44d. if coal and working expenses were taken together. That was what they gained. In residuals, the price in 1893 was 9·61d. per 1000 cubic feet; in 1894, 10·73d.; in 1895, 9·66d.; in 1896, 8·10d.; and in 1897, 7·10d. Here there was a loss of 2·51d. per 1000 cubic feet. Thus the shareholders would see that where the Company had improved had been in their working, which the Directors could control; and where they had lost had been in the sale of residuals, which they could not control. The consideration of these figures led to the conclusion that the amount by which their net profits were short of their statutory dividends in the year 1897, was not the result of increased cost of coal, nor of any increase in their working expenses, nor in their charges for interest on capital—each of these items being less than in their last good year, 1894—but it was the result solely of reduction in the market value of residuals, a matter over which the Directors had no more influence than they had over the weather. In 1894, their residuals yielded 10·73d. per 1000 cubic feet; while in 1897, they yielded only 7·10d. This was a reduction of 3·63d., or a loss of revenue for the year of £318,000; while their deficit for the year was £129,622 only. The net result was that, in order to pay the statutory dividend, they must have recourse to the reserve fund, which, as he had said over and over again, was a fund which existed only for the purpose of equalizing dividends, and for preventing constant changes in the price of gas. The amount they had to take was £74,519. This would leave the nominal amount of the fund at £48,483; but he was glad to say they could add £14,000 to this amount, making it up to £62,482, by reason of the increase in the value of the Consols in which the fund was invested. With regard to the future, he remarked that the unprecedented weather of the past month had had the effect of reducing their rental—he was dealing with this year—by the sum of £26,000, which meant a loss of profit to the shareholders of £10,000 for January alone. The month of February, with the exception of that day, had begun very much in the same way; so that it did not hold out much better prospects. The retail coke trade had also been adversely affected by the absence of the usual demand for fuel for domestic purposes; so that there was no longer any hope that the price of gas could be maintained at 2s. 10d. per 1000 cubic feet. The question of what they would do was under the consideration of the Court of Directors; and in accordance with the assurance which he gave last August, the sliding-scale would be put into operation, and such an addition would be made to the present price of gas as would secure the shareholders their statutory dividend. The conclusion which was thus forced upon them could not be more disappointing to their customers than it was to themselves; but at any rate the shareholders knew that, before adopting the course of raising the price of gas, the Company had exhausted nearly the whole of their accumulated reserve fund—the amount actually appropriated during the past three years towards the maintenance of the present price of 2s. 10d. per 1000 cubic feet having been no less than £337,000, out of a total reserve of £385,000. He thought all fair-minded people would agree that they had made a good fight on behalf of their consumers, and had been only defeated by causes beyond their control. He would add one word to the consumers. The loss of gas revenues which the Company had sustained during the past four months amounted to £53,000. This amount the consumers had gained; and it was equal to a reduction of more than 1d. per 1000 cubic feet on the consumption during that period. With regard to the probable duration of the increase, he might remark that he never prophesied without absolutely knowing that in all human probability his prophesy would be fulfilled; and he might say that, as far as they could judge from experience in the past, the addition they would have to make to the price of gas would be but for a short period. It would not be required, he should think, for above a year, unless the English climate changed altogether, and they had a series of winters such as they were experiencing this year. What they wanted was simply to maintain an equilibrium between the price of the gas and the dividend, with a little over to form a reserve fund, which would prevent sudden fluctuations in the price of gas. As he had mentioned, they endeavoured to hold the balance fairly between shareholders and consumers; and it was only when they were obliged to do so that they put the sliding-scale into operation. As a good deal of important business with regard to their Bill had to follow, he would not detain them any longer just then; but, of course, he would be glad to answer any questions which might arise. He concluded by moving the adoption of the report and accounts.

The DEPUTY-GOVERNOR (Mr. H. C. Ward) seconded the motion.

Mr. HOUNSOM said the interests of the Company were so great that he thought steps should be taken to let all the shareholders know what occurred at the half-yearly meetings, as very few of them were able to attend. The suggestion he had to make was that an authoritative statement of what transpired at the meetings should be placed in the hands of all the shareholders. The whole gas world was interested in what went on at their half-yearly gatherings; and he considered that those financially interested in the Company ought not to have to rely on garbled newspaper reports. He did not suggest that this was the nature of the reports published by the technical journals, or of many of the others; but he thought the shareholders should be furnished with some report of a reliable character. If it would assist the Directors in the matter, he should be pleased at the next half-yearly meeting to move a resolution which would give the Board the power of doing what he suggested.

Mr. DUNCAN, referring to an item of £209,094 of 2¾ per cent. Consols, in the accounts, asked where the interest derived from this investment appeared.

Mr. GEORGE LIVESEY, after remarking that the interest alluded to by the previous speaker had not been credited to the reserve fund during the past two half years, said the Governor had given them a very interesting statement, full of important details; but there were other matters which, he thought, should be considered by the meeting. The Governor represented the largest, and, therefore, necessarily the most important gas undertaking in the world—a gas undertaking which had an unrivalled district from whence to derive their revenue, an undertaking which had something like £12,000,000 of interest-bearing capital, half of which, being preference shares and debenture stock, might be said to be as safe as the Bank of England, and the other half of ordinary stock on which a dividend ranging from 12 per cent. to 13¾ per cent. had been paid for many years. It was small wonder that the shareholders appeared so indifferent about these constant deficits. They had had them for six half years; and now, in this half year, there was a deficit of £74,500. The question was, Was the Company managed as well as it should be, or might be? For this purpose one must make some comparisons; and he thought that the fairest and best comparison he could make was to make one with the Company itself; and to do this—to find parallel circumstances—he must go back some years. In 1888 the price of gas was a trifle under what it was now. It was 2s. 9d. *plus* meter-rents, which amounted to about ¾d. per 1000 cubic feet, or (say) 2s. 9¾d.; and the price charged the last three years had been 2s. 10d. inclusive of meter-rents, so that they got something very near a parallel. Of course, he knew what they would say about products. There were, however, other opinions about that matter. There was no gas man of his acquaintance who had spoken to him on the subject who had not said that the products need not have been so low in price if the business of this Company had been managed as it should have been. This was a matter of opinion. However, what he was dealing with now was a comparison with the year 1888; and he found in that year that, with a very much smaller output

of gas and a 13 per cent. dividend, there was a surplus profit of £90,000. In 1895, with a dividend of 12¾ per cent., and when products realized a trifle more per ton than in 1888, there was a deficiency of £87,000; in 1896 the deficiency was £115,000; and in 1897, with 3734 million cubic feet more gas sold than in 1888, it amounted to £129,000. Of course, this reduced the reserve. When the shareholders understood that these reserves at the beginning of 1889 amounted to £807,000, and were now reduced to £48,000—or to £62,000 including the increased value of the Consols, in which the money was invested—he thought they were entitled to ask seriously what had brought about such a state of things. They were now in this position—that they must raise the price of gas, which was, he considered, a very disastrous thing indeed to do. Well, now, why had they suffered these annual deficiencies? In 1894 the Governor said that if the two other London Companies would abolish meter-rents they would do the same. It would have been far better, if the Directors were contemplating such a step, to have asked the two other Companies to meet them in conference, and discuss the matter. He (Mr. Livesey) was bound to take up the point, and told them that his Company would do nothing of the sort; and he felt he could speak for the Commercial Company too. Neither of these Companies had abolished their meter-rents; but this Company had done so, and had thereby given away £60,000 a year. But the Company were not, after all, letting their consumers have the meters free; they were simply making an inclusive charge. It was a fallacy to suppose they were giving them free. The consumer must pay in meal or in malt—by a definite meter-rent or in the price of gas; and the fair way was not to pay for the meter in the price of gas. Let them consider the cases of a large house with a large meter shut up half the year, and a small shop with a small meter. It was probable a man who had a small meter burnt more gas than the other, because he was consuming gas all the year round; but by charging for the meter in the way the Company now did, they unfairly made the small man pay for the big one whose house was perhaps shut up half the year, or who used electric light.

The Governor said that was just what the big man did.

Mr. Livesey (continuing) said that, although this was so, the big man had the Company's meter free. There was a great deal too much talk about free everything. One heard about free gas-stoves, free gas-engines, and so forth. It meant that one man was to have the use of a thing and another was to pay for it. It was a Socialistic doctrine which he opposed in every way and everywhere. At the end of 1894 they reduced the price of gas 3d. per 1000 cubic feet, and taking off the meter-rents made the reduction equivalent to 3¾d. per 1000; and they at once increased the dividend under the sliding-scale. He (Mr. Livesey), as perhaps the author of that scale, might claim to know a little about it; and he said that its intention was to give power to gas companies to increase their dividends if they felt it advisable to do so, and not to take away their discretion. There might be cases where it would be wise to increase the dividend; and he thought when they had made this great reduction at the end of 1894, it was unwise to increase the dividend from 12 to 12¾ per cent. They should have waited to see if they could earn the money. The sliding-scale did not say they might have their dividend if they did not earn it. He did not object at the time—he felt that it was of no use to do so. But by taking off the meter-rents, the Directors took away £60,000 a year from the revenue of the Company. But that did not count; for they were called a 2s. 10d. Company just the same as if the meter-rents had not been abolished. The increase of dividend by ¾ per cent. required another £40,000; and therefore by these two items they had £100,000 a year accounted for—a sum which would about make up the deficiency of the past three years. If they had not taken off the meter-rents or increased the dividend, they would have had a reserve fund of about £350,000 instead of what they had at the present time. Now as to the working. He would deal only with one item—a large item, it was true—that of carbonizing wages. In the old days, before Socialistic Unions came into existence, gas companies got on very well with their men. Machinery was struggling for existence 25 years ago, but nobody cared to take it up because of the trouble it entailed. The cost of carbonizing wages used to be a little over 2s. 6d. a ton of coal—perhaps 2s. 7d. or 2s. 8d. The Gas Workers' Union came into existence, and put the cost up about 1s.—at any rate to not less than 3s. 6d. a ton. Now the carbonizing wages of this Company for the past half year, after taking off 1½d. per 1000 cubic feet for water gas, amounted to 3s. 6½d. per ton of coal. Last year it was 3s. 5d. per ton; so that there was a rise, comparing the two half years of 1896 and 1897, of 1½d. per ton. He wished to point out what other Companies had done. An old friend of his, of great experience in gas matters, said to him in 1889, in the middle of the labour troubles, that this was what would happen: In three years they would see machinery universally adopted to displace labour. He confessed that he did not like the introduction of machinery simply for the displacement of labour, but it had to be done. What had other Companies done? He would take two of the Company's neighbours. These two had set to work, and, in the last seven years, they had reduced their carbonizing wages—one of them to something less than 2s. 3d. per ton of coal within the last half year, and the other to close on 2s. One of the Companies to which he referred—that on the West—was the one so well presided over by the Deputy-Governor, and his very able late Engineer, to whom, he believed Mr. Ward would say, the credit was largely due for having reduced the carbonizing wages to 2s. per ton. But, taking 2s. 3d., which might have been done in the Chartered Company's case, they would have saved 1s. 3d. per ton on their carbonizing wages. This did not seem much, perhaps; but multiplying by 2,060,000 tons they would get close upon £129,000 in the year. This was the sum which might have been saved in carbonizing wages if they had only gone to work as other Companies had done, and adopted machinery. That would have met the whole of the deficiency. He wished next to refer to the question of capital per million cubic feet of gas. Gas-works of moderate size could be equipped—lock, stock, and barrel, purchase of land, working capital, and everything—at £500 per million; and additions to large concerns ought to be done for less—£300 per million should be sufficient. He had taken out the capital of this Company and of the other two Metropolitan Companies, because he wished to compare things that were comparable; and he found that from 1889 to 1897 the capital of this Company had increased in the ratio of £828 for every additional million cubic feet of gas sold in the year. The other two Metropolitan Companies had increased in the ratio of £300 per million—one was £298 and the other £308—in those years. They had all gone into the same business—the automatic supply of gas. One of the Company's neighbours had had a large increase, and the other a small one; but the result was the same. Both had increased at the rate of £300 per million cubic feet since 1889; whereas the Chartered Company had increased their capital £828 per million. If they had done it at the same rate as the others, they would have had to raise £1,500,000 less capital than they had done, the interest on which, at 4 per cent., amounted to £60,000 a year. He would give the proprietors one item to show how this money had gone. The Company had supplied a large number of prepayment meters. He had added the figures up from time to time, and, at the outside, he estimated that the number did not exceed 80,000.

The Governor remarked that this was correct.

Mr. Livesey said he found in their balance-sheet an item of £281,000 in suspense. This meant that it was an asset to be recovered out of the extra price they charged for the gas sold through the slot meters. Now, £281,000 for 80,000 meters was a debt, so to speak, of £3 10s. per consumer for fittings. It might be perfectly right; but let them see what other Companies had done. Their neighbour had nearly as large a number—66,000—and their suspense account worked out at 9s. 6d. per consumer, or (say) just under 10s. Their maximum was 13s. a year ago, and now 10s. per consumer—a reduction of the item in suspense from £37,000 to £31,000. But while that Company had reduced the amount, the suspense account of this Company had gone up by leaps and bounds to £281,000. Why was this? The answer was, Because they went about the work in a more extravagant way than other people. They had supplied unnecessarily large meters and stoves, at a cost of £10 per consumer; whereas other Companies had done it for £6. Why was the outlay of this Company so much higher than with others? What did all this mean? It was no use for him to attend these meetings and make such statements as he had done unless he had some proposition to offer; and he was sorry to have to make the suggestion he was going to do. It was a thankless task, and he did not like it at all. But there was no one else to do it. Other shareholders did not take up the question. They took their dividends, and this great concern was allowed to go on and on without any interest being shown in what was being done. What he had said was an impeachment of the management. Colonel Makins had been Governor of the Company for fifteen years. This was quite long enough to make or mar the concern; and he (Mr. Livesey) said deliberately that there was no hope for it, in his opinion, until Colonel Makins gave up the reins. Let the Board be thoroughly reconstituted, and one appointed capable of dealing with the business. He must also speak about another man; and he wished to do so with every consideration. Five years ago the Directors were warned not to make a certain appointment; but they did, though they were told that to do so would be a mistake. He had heard a great many people express strong opinions about that gentleman; but not one had given utterance to the slightest suspicion of his honesty or integrity. The gentleman in question was thoroughly honest, and, what was more, he was thoroughly devoted to the interests of the Company. But this was not enough. There were many men at the head of their own business who were, of course, honest and devoted to it; but still they did not possess the necessary qualification for managing it, and it consequently went to ruin. It was not the gentleman's fault that he occupied the position he did. It was the mistake the Board had made in putting a triangular man into a square hole. What was required in a great concern like this was a man at the head and a general manager who were born leaders of men—who could attract and attach others to them, and create such a spirit that all would work loyally for the good of the concern. He said this because such was not the case at present. He would not speak more strongly than that there was not that loyalty and hearty co-operation there should be; but it was not the fault of the staff. He believed they had a staff of men as good as those of other Companies. They had a staff of men who would work heartily, but they wanted proper leaders; and until there was a change at the head, they could not expect an improvement in the prospects of the Company. If the statements he had made were not true, they were scandalous and disgraceful; and he should say it was the duty of the shareholders to ascertain whether or not the statements could be substantiated. If they could not, he ought to be exposed and disgraced; but if they could, then the responsibility would rest on the shareholders to do what they felt right and necessary for restoring this great, important, and immensely valuable concern to its proper position in the gas world.

Mr. Galbraith, referring to the £281,000 suspense account, said he should like the Chairman, in his reply, to say if they were gradually writing off this large sum of money; and, if so, at what rate per annum. The extra price charged for the supply of gas by prepayment meters ought to enable them to liquidate the amount; but if it were not sufficient, the price should be raised. He thought they ought not to go on increasing their capital account from year to year by huge sums, without making provision for writing off expenditure on perishable articles.

The Governor, in reply, said the suggestion of Mr. Hounsom was one entirely for the shareholders. There were various practices adopted by various companies. Some issued merely a *résumé* of the results of their meetings, others a sort of extract from some particular journal; while again others had their own shorthand writer, and issued a report which was edited from the board-room. His feeling, and that of his colleagues, was that, considering the size of the Company and the notoriety of their proceedings, and the fact that all that took place was reported the next day in "The Times," and a few days afterwards in the technical journals and in a great many local papers, as well as the London Press generally, it was hardly necessary. Moreover, it would involve their having to edit the report which, if it were to be *in extenso*, would be a duty they would not like to have thrust upon them unless a large number of shareholders wished it. But Mr. Hounsom had intimated that he would give notice of the suggestion for next August; and then, whatever was the decision of the shareholders, the Board would carry out. With regard to Mr. Duncan's question about the interest, he said that part of it went into the insurance fund, and the remainder into general revenue.

Mr. Duncan said it was not shown.

Mr. Field pointed out that it formed part of the interest in the general revenue account.

Mr. Duncan asked under what item.

Mr. Field said that in account No. 5, on the debit side, they would see

interest on temporary loans and sundry funds, less credits. The amount of credits was the interest on Consols not carried to the insurance fund.

Mr. DUNCAN remarked that he thought it would be better to show it.

The GOVERNOR (continuing) said the accounts were made up in accordance with the Board of Trade form; but the Directors could always give supplementary information, if required. Referring to Mr. Livesey's speech, he observed that that gentleman had appeared at their meetings for many years past, and had made repeated attacks on the conduct of the management of the Company. He had never, he believed, but once had the courage of his opinions to move a resolution; and then, when it had been moved and seconded, it met with no support, and was withdrawn. Their duties as Directors had been carried out in the face of the world, and before the eyes of the shareholders. Half year after half year, he had explained their figures, and the way in which they had conducted the business; and the reports had been received with approval by the shareholders. Mr. Livesey, and he alone, had time after time come to the meetings and attacked the management of the Company [A VOICE: Because he has the knowledge]. He did not dispute Mr. Livesey's knowledge. Mr. Livesey was brought up in the business, and understood it; but he did not think that because a man had technical knowledge he should try and mislead the shareholders of another Company [A VOICE: He has not]. The Company had been a success; and, as Mr. Livesey had said, he had been the Governor of it for fifteen years. He had been a Director of this and the Western Company for 32 years; and he had also been a Director of the Great Eastern Railway Company—which might also be considered as not an utter failure—for 32 years. Therefore he was not absolutely without some qualification to occupy the position which, by the kindness and confidence of his colleagues, he filled. At any rate, it was for Mr. Livesey to move a resolution, and get it carried; and then, if they refused to adopt the report, the Managers of the Company and the Directors would know what to do. They would at once bow to the expression of feeling of the shareholders, and retire in favour of some other men. But while they possessed the confidence of the shareholders, he thought it would be desertion on their part if they were, because they did not come up to the standard of Mr. Livesey, to relinquish their duties. The Directors had no intention of doing anything of the kind. Mr. Livesey said it gave him pain to make certain statements. It gave him (the Governor) greater pain to say what he was about to say. They would recollect that Mr. Livesey was the ancient historian and Jeremiah of this Company. Mr. Livesey had raked up matter as far back as 1880; but there was one thing he did not mention, and that was the litigation which took place between his Company and theirs about the Nine Elms business. It was in his anger over that matter, and the beating he got in the House of Lords, that he wrote a letter to the late Mr. Phillips, in which he said he forgave him his share in the transaction, but that he never would forgive the Governor or Mr. Field.

Mr. LIVESEY said he would forgive them if they uttered one word of regret that they had not acted in accordance with the strongly-expressed wish of the shareholders at the meeting in February, 1890. He purposely avoided all reference to the Nine Elms matter, because he felt it would have been said that any remarks he made about it were the result of petty spite. He could assure the proprietors that he had not been influenced by it at all.

The GOVERNOR (continuing) said the shareholders must draw their own conclusions. If this were not the case, why did Mr. Livesey year after year make his attacks on the Board? He would put that aside, however, as he felt it was unworthy of a great Company such as theirs that they should be drawn into these personal disputes. When Mr. Livesey made a charge against the management, and substantiated it by figures, they would deal with it. [A VOICE: But he has done so.] With regard to abolishing the charge for meters, the Company was in a different position from the South Metropolitan and Commercial Companies. They had a district in the City where meter-rents were not allowed; and there was the comparison constantly thrown in their teeth, that in one part of their district they were charging for meters and in another part they were not. The consumers had had the advantage of free meters, and so had the shareholders in dividends. The money had fructified in the pockets of the shareholders; and why, he should like to ask, should they adopt the principle of withholding part of their dividend in order to get a reserve fund? He maintained that the sliding-scale—he was not prepared to admit that Mr. Livesey was the author of it—though permissive, was a sort of guarantee to the shareholders as to what would be the result of their investments. They had issued to the public a great deal of capital on the faith of the sliding-scale; and if they were not to put it in force when necessity arose, they would be breaking faith with those who had subscribed the capital of the Company. He did not think Mr. Livesey could have considered this view of the matter. Then Mr. Livesey had compared them with the Company of which their Deputy-Governor was the Chairman—the Brentford Company—and had pointed out how much less the carbonizing wages were there than in their own Company. Mr. Ward would tell them, if the question were put to him, that he attributed a very large proportion of the reduction of his carbonizing wages to the introduction, from time to time, of inclined retorts for horizontal ones. He should like to ask Mr. Livesey what it would have cost this Company to have taken out their horizontal retorts and replaced them with inclined ones. They were gradually adopting the principle. They had at Bow Common an installation which was being carefully watched; and if it should answer their expectations, they would in future introduce the use of inclined retorts to a much greater extent than at present. Mr. Livesey had compared Companies whose circumstances were absolutely different; and therefore not fairly comparable. Let them look at the increased consumption Mr. Livesey's Company was able to show from year to year in Wandsworth and other growing districts. Their own Company was more confined, and did not possess any new and growing districts.

Mr. LIVESEY remarked that the Commercial Company had not them either.

The GOVERNOR said that Company was on a different footing, and had a different class of customers to supply. In their own case they had to go through empty squares and terraces in the West-end; and they had also to compete with the electric light. His friend Mr. Livesey—if he might still be allowed to call him so—did not suffer in his district one-quarter of the competition from the electric light that they did. He should say the electric light competition in the South Metropolitan Company's district was a very small figure, and might be expressed by a fraction. With their own Company, however, it was a serious matter. Mr. Livesey complained of the large amount which they had expended on fittings in connection with the supply of gas by prepayment meters. He believed the explanation was that they had put in 5-light meters, whereas other Companies, in many cases, had supplied 3-light meters only. They had put in substantial work, which had been carried out by their able Distributing Engineer, Mr. Foulger, who had just received the unqualified praise of Mr. Livesey. Mr. Foulger had advised them that it was unwise to put in composition pipes or cheap work of any kind. They had accordingly done good work which would last. The £281,000 which had been referred to by Mr. Galbraith as well as by Mr. Livesey was being written off at the rate of £40,000 a year. It would increase from time to time; and the more it increased the more they would be pleased. But the scheme for writing off and dealing with this capital had received the approval of the late Board of Trade Auditor as well as the present one. He did not think they could have a higher authority to justify the course they had taken. Another reason why they should put in the larger meters was because thereby they sold a greater quantity of gas. He did not know what was the average amount of gas passing through the automatic meters of the South Metropolitan Company, but theirs was very satisfactory.

Mr. LIVESEY said he would tell them, if they would tell him what theirs was.

The GOVERNOR thought that was a fair offer, and added that the quantity was 19,000 cubic feet per meter.

Mr. LIVESEY said theirs was the same—19,500 cubic feet where there was a stove, and something less when there was not. He believed this Company's were all with stoves.

The GOVERNOR said he gave the average of the whole. Would Mr. Livesey do the same?

Mr. LIVESEY replied in the negative. He said a certain number of theirs did not have stoves, and these passed about 12,000 cubic feet a year. His Company had 66,000 meters and 52,000 stoves with the meters; whereas he assumed that this Company had stoves in all cases.

The GOVERNOR (continuing) said a 3-light meter would give a poor service to a stove. But a detail of this sort ought not to form the basis for a discussion on the general management of the Company; much less ought it to afford a reason for an attack on his unworthy self and the General Manager. Those who worked with the General Manager from day to day knew perfectly well the ability and zeal Mr. Field had brought to bear on the Company. He was a gentleman who had been in the gas world all his life, and his father before him. He was not a neophyte by any means. If the attack had been made on some Stock Exchange man who had been put on by the Board, and knew nothing about the business, he could have understood it; but as things were, he thought the attack had gone a little too far. The proper way was for Mr. Livesey to move an amendment, if he wished to bring matters to an issue.

Mr. LIVESEY said he had been charged with misleading the shareholders, and challenged to move an amendment. He did not want to do so; but he should like to propose that a Committee be appointed to test the truth of the statements he had made.

The GOVERNOR said that would be an amendment.

Mr. LIVESEY replied that he would rather let the report be carried, and make his a separate motion.

A SHAREHOLDER thought it was the usual course when a complaint had been made against the management of a Company, that the gentleman making it should be challenged, as Mr. Livesey had been challenged, to express his opinion with regard to the Board, and not of individuals. Therefore he thought Mr. Livesey's motion should be taken as an amendment. He hoped the Governor would order that this should be done.

Mr. SADDLER said he would second Mr. Livesey's amendment.

A SHAREHOLDER asked if it would not be as well if the amendment were withdrawn until the next meeting. They would then have more time to consider the matter; and other shareholders would have had the opportunity of learning what had been said.

Mr. LIVESEY said that he could not defer the matter; and if the Directors did not send out a report of the meeting to all the shareholders, he would do so. He thought if the Solicitor would say that his motion could be put as a separate motion, it would be better than putting it as an amendment.

The GOVERNOR then requested Mr. Livesey to put his amendment into writing; saying that he declined to accept it as a separate motion. On receiving it, he remarked that the form in which Mr. Livesey had sent up his amendment was as follows: "That a Committee be appointed to test the accuracy of my statements made at this meeting." He (the Governor) was sorry to say that it was out of order. It was competent for Mr. Livesey to move for a Committee to inquire into the conduct of the Board, but not to inquire into his own statements. There was no precedent for appointing a Committee to investigate the statements of an individual.

Mr. LIVESEY said the Governor had distinctly told the meeting that he was misleading them.

The GOVERNOR said that was his opinion.

Mr. LIVESEY remarked that he would, then, alter his amendment so as to make it read: "That the Chairman, having stated I was misleading the meeting by my statements, a Committee be appointed to test the accuracy of them."

The GOVERNOR observed that this preamble did not vary the position.

The resolution was then put to the meeting; and the Chairman declared it carried *nem. con.*

Resolutions were afterwards passed declaring the dividends, re-electing the Directors and Auditors, and empowering the Directors to dispose of certain lands not required for the purposes of the Company.

An Extraordinary General Meeting was then held, when the Bill to be introduced into Parliament, entituled: "A Bill to Consolidate and Convert the Capital of The Gaslight and Coke Company, and for other Purposes," was submitted for the approval of the proprietors.

Mr. LIVESEY, at the opening of the proceedings, said that he had to attend a meeting at Sydenham; but before going, he desired to say that he quite approved of what they proposed doing under the Bill.

The GOVERNOR remarked that he need not say with what satisfaction

they learnt that. Proceeding, he said the Bill had been introduced into the House of Commons pursuant to the wish of the proprietors, and also, of course, on their own motion. The object of it was simply to cut up their unwieldy cake into convenient slices. It would not give a crumb more to any existing member, or take away one. It was purely a matter of arrangement—of capital consolidation; and he could not understand how there could be any opposition to it from the proprietors. If there should be, it was more likely to come from outside than from those within the Company.

The SOLICITOR then read the preamble of the Bill, and explained its various clauses.

The GOVERNOR said they would see, from Schedule E, that the stock was to be divided up on the basis of 4 per cent. Under the sliding-scale, every holder of £100 ordinary stock was entitled to 10 per cent. In place of this £100, the holder would receive £250 entitled to 4 per cent. The same principle was carried out in dealing with the preference and debenture stocks.

Mr. DUNCAN asked how the sliding-scale would be affected by the provisions of the Bill?

The GOVERNOR replied that if the Bill had been in operation on that occasion, their dividend, instead of being 12¾ per cent., would have been at the rate of £5 2s per cent. on £250 of stock.

Mr. DUNCAN inquired whether, under the Bill, the effect on the dividend of increasing the price of gas 1d. per 1000 cubic feet would be the same?

The GOVERNOR replied that at present every penny rise in the price of gas affected the dividend on £100 of stock to the extent of 5s. As, under the Bill, this £100 of stock would be exchanged for £250 of stock, a penny rise in future would affect the dividend to the extent of 5s. for £250 of stock; but, of course, the actual result would be the same.

A SHAREHOLDER asked for some explanation of the position of the "H" 7 per cent. stock, and the "B" stock.

The GOVERNOR replied to the effect that every £100 of "H" stock would be turned into £200 of stock carrying 3½ per cent. interest, which would not be affected until the dividend on the ordinary stock fell to £2 odd per cent. The "B" stock only amounted to £200,000; and it was proposed to make it a 4 per cent. preference stock in all circumstances.

A SHAREHOLDER inquired if, in connection with the exchange of the old stock for the new, there would be any charge made to the shareholders for the certificates.

The GOVERNOR said there would be none whatever; nor yet for registration. He then moved a resolution that the Bill be approved, subject to such amendments or alterations as may be made therein by Parliament, and assented to by the Directors.

Mr. WARD having seconded the resolution, it was agreed to unanimously.

A vote of thanks to the Governor, Chairman, and Directors, proposed by Mr. ROKEBY PRICE, brought the proceedings to a close.

SOUTH METROPOLITAN GAS COMPANY.

The Half-Yearly Report and Accounts.

The following is the report of the Directors of the above Company for the six months ending Dec. 31 last, which, with the accounts for this period, will be presented at the half-yearly general meeting on the 16th inst.:—

Formerly, with rare exceptions, an even tenour of prosperity characterised the gas industry. The variations were chiefly owing to variations of weather. Other circumstances now seriously affect the revenue—namely, the prices obtained for residual products, coke, ammonia, and tar. The depression following the unwarranted inflation of the price of coke two or three years ago still affects that trade. Ammonia at the close of the half year began to recover from the lowest price ever known; but tar has sunk considerably below its mere value as fuel—realizing £10,848 less than in the corresponding half year. Some of the causes of these fluctuations are beyond control; but others could be dealt with if the leading gas undertakings would act together. Tar, for instance, with sub-products of enormous value obtainable only from it, realizes less per gallon now than it did when the sub-products consisted only of naphtha, creosote, and pitch.

Notwithstanding the extremely low prices of products, the Directors have the pleasure to state that the earnings have been sufficient to pay the usual dividend, and to leave a balance to carry forward. This satisfactory result is due to two causes—viz., an increase of over 6 per cent. in the quantity of gas sold, and to various economies in working due to the interest the staff and the employees generally take in the well-being of the Company.

It will be interesting to the proprietors to be informed that as a result of the profit-sharing scheme started in 1889, practically the whole of the regular employees of the Company are now shareholders, holding stock of the value of £69,000, in addition to £37,000 on deposit, at interest, with the Company; making a total of, in round numbers, £106,000. When the scheme was started, the rate of interest paid by the Company on new issues of ordinary and debenture stock averaged nearly 5 per cent.; and this being so, the Directors felt justified in offering 4 per cent. to the employees on their deposits. But now the average rate paid by the Company on new issues is rather under 3½ per cent. Under these circumstances, the Directors felt that it was not in accordance with sound business to pay more on the deposits. The question was explained to the workmen's representatives, who unanimously agreed that it would be right to reduce the rate of interest. To encourage thrift, the Directors proposed that 4 per cent. should be continued on small deposits (£20 was the limit adopted); and on all amounts over that limit the rate of interest was reduced to 3 per cent. from Jan. 1 last. This was readily accepted by the workmen; and, excepting a few hundred pounds withdrawn for investment in the Company's stock, the deposits remain as before the reduction of interest.

The Directors are also glad to report that the dispute with certain of the outer parishes on the question of rating has been settled amicably and satisfactorily. The Court based its decision on the excessive earnings (which, however, could not be divided among the shareholders) of the year ended June, 1895. That excess was given to the consumers in the shape of a reduction in the price of gas in the following year, with the result that the earnings of the twelve months to June, 1897, were barely sufficient to pay the dividend. A claim for a reduction of rateable value was consequently made on that basis; and all the parishes concerned reduced the rating in accordance with the representations of the Company. The benefit of the reduction, however, being prospective, was not felt in the half year.

In the past year a considerable amount of old plant has been renewed and improved, and the whole cost has been charged against revenue. The undivided balance of £1350 with which the year began was exhausted last June; but the profit of £175,057 shown in the revenue account enables the Directors, after meeting all charges, to recommend the same dividend as the last—viz., at the rate of 5¼ per cent. per annum—which will leave a balance of £1802 11s. 4d. to carry forward, independently of the reserve fund of £94,873.

In accordance with the Act of Parliament, two Directors (Mr. John Mews and Mr. Simpson Rostron) and one Auditor (Mr. William Westcott) go out of office by rotation. They are all eligible for re election, and offer themselves accordingly.

The accounts accompanying the report show that the total amount of capital raised at the end of the past half year was £6,991,250, of which £6,828,965 had been expended—£55,706 in the six months reported upon. Additional debenture stock to the amount of £43,333 was raised in this period; and the premium thereon (£2525) is deducted from the total expenditure on capital account to June 30. The amount of premium capital previously received is £22,507. The £55,706 is made up as follows: New buildings and machinery, £6923; new and additional mains and services, £17,453; meters, £16,606; and stoves, £14,724. The revenue and net revenue accounts are given on p. 291. The statements relating to the reserve, renewal, and insurance funds show that the balances on Dec. 31 were as follows: Reserve fund, £94,873; renewal fund, £16,846; and insurance fund, £44,864. The statements dealing with the manufacturing operations of the Company furnish the following particulars:—

STATEMENT OF COALS.

Description of Coal.	In Store, June 30, 1897.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, Dec. 31, 1897.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal.	32,487	506,030	461,134	435	76,978
Cannel coal	1,461	865	856*	..	1,440
	33,948	506,895	461,990	435	78,418

* 286,094 gallons of petroleum spirit used as a substitute for cannel.

STATEMENT OF RESIDUAL PRODUCTS.

—	In Store, June 30, 1897.	Made during Half Year.	Used in the Half Year.	Sold in the Half Year.	In Store, Dec. 31, 1897.
Coke—cwts.*	522,596	5,688,958	1,165,401	4,612,060	432,093
Breeze—yards	2,227	99,493	15,331	76,195	9,194
Tar—gallons	645,779	4,527,587	44,322	4,713,465	415,579
Ammoniacal liquor—butts. .	9,458	143,095	31,501	100,716	20,336

* 1 cwt. of coke about equals 1 sack of 4 bushels, under Weights and Measures Act, 1878.

STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity made.	Quantity Sold.		Total Quantity accounted for.	Number of Public Lamps.
		Public Lights (estimated).	Private Lights (per Meter).		
	Thousands.	Thousands.	Thousands.	Thousands.	
Common .	4,767,870	235,178	4,217,403	4,518,580	20,472

The remaining statement is the balance-sheet, which gives the value of the stores in hand as follows: Coals and enriching materials, £41,355; coke and breeze, £10,361; tar, sulphate, and liquor, £6179; and sundries, £126,191. The figures this time last year were: Coals, &c., £33,753; coke and breeze, £8719; tar, &c., £9302; and sundries, £112,671. A sum of £37,027, workmen's bonuses and savings, has been deposited with the Company; and the total of the officers' superannuation and guarantee funds is £32,926.

The Public Lighting of Lingfield.—At a largely attended parish meeting held last Tuesday, the Lighting and Watching Act was adopted for Lingfield. The scheme comprises the provision of 30 lamps about equally divided between Dorman's Land and Lingfield; and it was stated that the initial cost of the lamp-columns and the first year's lighting could be met by a 2½d. rate. After this the expense would be only a rate of ¾d. in the pound annually. The motion to adopt the Act was carried by 57 votes against 22; and a poll was demanded.

The Amalgamated Water-Gas Companies to be Wound Up.—In accordance with the resolution passed at the meeting of the above-named Company on December 31 last (see *ante*, p. 33), an extraordinary general meeting of the shareholders was held in Leeds on Monday last week—Mr. Samson Fox in the chair—at which the following resolution was agreed to: "That it has been proved to the satisfaction of this meeting that the Company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same; and that accordingly the Company be wound up voluntarily." Mr. John Gordon, jun., was appointed Liquidator. The Chairman, at the close of the formal business, said he was only sorry that it had been necessary to hold such a meeting. There had been a great many reasons which had stood in the way of his strong will to carry through what would have been a success; but he had no more power than most strong men. He was sorry that the grand venture which they started with so many years ago had come to that; but it had not been through any idleness of his. There had been forces and interests against him that he could not have foreseen, or have forced out of his way during the time they had tried to work it through.

ACCOUNTS OF THE SOUTH METROPOLITAN GAS COMPANY FOR THE HALF YEAR ENDED DEC. 31, 1897.

REVENUE ACCOUNT.

To Manufacture of gas—				By Sale of gas—			
Coals into store, including cost of petroleum spirit for enriching and including £20,365 1s. 2d. for labour	£243,933 10 1			Michaelmas, at 2s. 3d. per 1000 feet	£169,519 11 8		
Purification, including £6330 6s. 10d. for labour	12,988 17 5			Christmas, at 2s. 3d. per 1000 feet	301,085 12 4		
Salaries of Engineer and Officers at works	6,532 13 8				£470,605 4 0		
Wages (carbonizing)	51,418 19 6			Public lighting and under contracts	24,892 9 3		
Repairs and maintenance of works and plant, including £41,493 4s. 5d. for labour, less £1454 9s. 0d. received for old materials	74,377 4 11					£495,497 13 3	
		£389,248 5 7		Lighting and repairing, &c., public lamps		7,232 4 1	
Profit sharing		7,000 0 0		Meters in use: 164,617—			
Distribution of gas—				Company's meters at rent: Ordinary, 86,743; automatic, 66,560	£16,251 16 3		
Repair, maintenance, and renewal of mains and service-pipes (labour, £13,585 0s. 5d.)	£17,933 18 9			Company's Stoves and fires at rent: Ordinary, 96,501; automatic, 52,096; fires, 8395	14,302 10		
Salaries, &c., Officers and Rental Clerks	11,027 7 10					30,554 6 9	
Repair, &c., of meters (£1107 5s. 9d. for labour)	8,880 9 7			Residual products—			
Repair, &c., of stoves (£3733 3s. 8d. for labour)	4,696 5 6			Coke, less £15,742 15s. 6d. for labour, &c.	£103,433 12 3		
Gas-fittings (labour)	1,922 6 11			Breeze, less £2603 18s. 9d. for labour, &c.	4,798 19 11		
		44,510 8 7		Tar, less £645 6s. 3d. for labour, &c.	11,752 2 4		
Public lamps—lighting and repairing, including £6231 8s. 8d. for labour		7,232 4 1		Ammoniacal liquor, less £241 10s. 6d. for labour, &c.	12,153 6 7		
Rents, rates, and taxes—				Sulphate of ammonia, less £676 7s. 3d. for labour, &c.; £3733 15s. 1d. for acid, &c.	7,807 3 5		
Rents payable	£337 13 6					139,945 4 6	
Rates and Taxes	29,017 8 7			Rents receivable		1,586 18 10	
		29,885 7 1		Transfer fees		69 12 6	
Management—							
Directors' allowance	£1,750 0 0						
Salaries of Secretary, Accountant, and Clerks	2,179 19 10						
Collectors	7,840 19 0						
Stationery and printing	1,764 7 3						
General charges	3,346 4 8						
Company's Auditors	112 10 0						
		16,991 0 9					
Law charges	£196 18 5						
Parliamentary charges	250 3 11						
		447 2 4					
Bad debts		1,306 12 10					
Pensions and officers' and men's superannuation and sick funds		2,985 16 11					
Gas Referees and Official Auditor		216 17 0					
Total expenditure		£499,856 15 2					
Balance carried to net revenue account		175,057 19 9					
		£674,914 14 11		Total receipts		£674,914 14 11	

PROFIT AND LOSS (NET REVENUE) ACCOUNT.

Dividend for half year ended June 30, 1897		145,195 6 3		Balance from last account		£140,033 1 9	
Interest on temporary loan and deposits		£1,548 10 4		Amount from revenue account		175,057 19 9	
Interest on debenture stock		21,575 0 6		Interest on Bankers' balances		225 13 2	
Balance applicable to dividend on the ordinary stock		146,997 17 7					
		£315,316 14 8				£315,316 14 8	

BRENTFORD GAS COMPANY.

The Half-Yearly Report and Accounts.

In the report which the Directors of the above-named Company will present at the half-yearly general meeting next Friday, they state that the increase in the sale of gas in the six months ending December 31 last was at the rate of 9 per cent., compared with the corresponding half of the previous year. The number of consumers of gas on the prepayment meter system continues to augment; there being 11,421 of these meters in use at the close of the past year, against 8157 on Dec. 31, 1896—an increase of about 40 per cent. The new manufacturing plant at the Brentford works was completed in October, and has since been in satisfactory operation; and that at Southall will, it is hoped, be finished during the current six months. The plant generally, under the supervision of the Engineer and Manager (Mr. J. Husband), is in complete order. The accounts accompanying the report show that the receipts amounted to £141,930, as compared with £132,675 in the corresponding half of 1896; and the expenditure, to £103,827, against £95,706—leaving a balance of £38,103, against £36,969. The amount available for distribution is £58,729, as compared with £60,380; and the Directors recommend dividends at the rates of 5, 12, and 9 per cent. per annum on the preference, consolidated, and new stocks respectively.

With regard to the general working of the Company in the past half year as shown by the accounts, we find that a sum of £24,899 was expended for capital purposes; £12,680 being for new buildings and machinery, £3393 for mains and services, and £8826 for meters and stoves. These items brought up the total capital outlay at the close of the year to £933,572; leaving a balance of only £16,408 unexpended. It is therefore the intention of the Directors to issue a further amount of new stock. The principal receipts on revenue account are as follows—the figures for the corresponding half year being given in parentheses: Sale of gas by meter, £104,423 (£94,802); public lighting, &c., £8362 (£8582); meter and stove rentals, £7780 (£6789); residuals, £21,331 (£22,436). The following are the chief heads of expenditure: Manufacture, £75,859 (£70,288); distribution, £12,949 (£11,172); management, £4764 (£4523). The quantity of coal carbonized was 77,344 tons; of cannel, 273 tons—together, 77,617 tons, as against 74,388 tons; and solar oil equal to 3362 tons of coal was used. The bulk of gas made was 817,021,000 cubic feet, as compared with 747,656,000 cubic feet. The residuals produced are estimated as follows: Coke, 51,700 tons; breeze, 6491 tons; tar, 769,254 gallons; ammoniacal liquor, 21,905 butts (including 481 butts purchased).

Fatality at the Heywood Gas-Works.—A workman, named William Cannon, had his arm plucked completely out by a coal-elevating machine at the Heywood Corporation Gas-Works last Thursday, and died in the Infirmary during the night.

Ashton-in-Makerfield Gas Supply.—In the paragraph on this subject in the "JOURNAL" for the 25th ult., the name of the Gas Engineer whose report was dealt with should have been Mr. James Hill, who is also Secretary to the Gas Committee.

TOTTENHAM AND EDMONTON GAS COMPANY'S BILL.

The Consolidation of the Capital—The Electric Lighting Provisions.

An Extraordinary Meeting of the Tottenham and Edmonton Gas Company was held last Saturday—Mr. CORBET WOODALL in the chair—for the purpose of considering the Bill now before Parliament, to make further provision as to the capital of the Company, to empower them to supply electricity, and for other purposes.

The SECRETARY (Mr. J. Randall) having read the notice convening the meeting,

The CHAIRMAN said the objects of the Bill which they had met to consider were threefold: First, there was the raising of additional capital wherewith to carry on the growing business of the Company; secondly, the conversion of the capital into stocks with a nominal rate of dividend more in accordance with the actual rate received by the shareholders; and, thirdly, the power to supply electricity if the Company could arrange terms mutually satisfactory to the Local Authorities and to themselves. Respecting the capital, they were proposing to double the present amount. As they were going on now, the business would double in about ten to thirteen years. Therefore, it could not be regarded as an extravagant thing to ask for money sufficient to carry them on for about that period. Parliament usually contemplated that Companies of a character such as theirs would receive powers sufficient to enable them to go on for ten to fifteen years. It was an extravagant thing to go back to Parliament at more frequent intervals, because applications to Parliament could not be made without an expenditure of considerable sums. With regard to the conversion of the stocks, the proprietors were aware that they were paying nominally 9 per cent. on the 7 per cent. stock; and of that 7 per cent. stock, by far the larger proportion had been sold by auction to pay the purchaser slightly above 4 per cent. It was therefore altogether misleading to the public and to the Company's customers that they should continue to call the stock a 7 per cent. stock, paying 9 per cent. The rate at which the shares were sold quite recently was £224 per £100, which brought the investor £4 0s. 5d. per cent. What they proposed doing was to convert the amount of 7 per cent. stock issued into an equivalent larger amount bearing nominally 5 per cent., and to reduce the increased dividend due to the reduction in the price of gas in proportion to the increase of the nominal capital. Take, for instance, the 10 per cent. stock, upon which they were paying 12 per cent., that would be doubled in amount; and instead of paying an additional ¼ per cent. dividend for each penny reduction in the price of gas, they would pay ⅓ per cent. There were therefore two objects in this consolidation—first of all, to simplify the stocks; and, secondly, to make the nominal payment to the shareholders more in accord with the actual rate. Regarding the question of electric lighting, the Board had had the matter under consideration for something like two years. They were very decidedly of opinion that they were in a position as a Company to supply the electric light, if the consumers wished it, at a cheaper rate than it could be supplied by an independent Company, who would necessarily have to bear the cost of establishment charges, amounting to a considerable percentage on the business done. The Directors were also of opinion that they could do the business at a lower rate than the Local Authorities. They supplied gas in the districts of four

different Local Authorities. The business over the whole was a fairly big one; but in an individual district, it was a small one. The Company had in their mains a system of power distributed over the whole area supplied with gas. From these mains, they could take a supply of power for the purpose of generating electricity at any spot where the demand arose. As the proprietors were probably aware, a heavy charge in the supply of electricity was in the distribution; and if they had to carry the current a long way, the losses would be considerable. If the Company established stations at the points where the demand arose, they would be able, so the Directors thought, to supply the demand very economically. He might say that immediately the Directors decided that an application to Parliament was inevitable, they informed each of the Local Authorities of their intention, and invited them to meet the Board and discuss with them the proposals to be embodied in the Bill. They received polite letters from each of the Councils, and had met three of them. If nothing more came of the Bill than those interviews, he should feel it had been of some use, because the Directors were very much gratified with the way the whole position was talked over—the exceedingly friendly way in which all the points were considered and weighed by the Councils. The Directors had received from each of the Authorities such communications as showed that what they desired was simply to conserve the interests of the consumers of gas and the would-be users of the electric light, and that there was no rooted determination to oppose in a mere captious spirit whatever the Company might propose to do. He was sure the interviews had had a permanently good effect in the relations between the Company and those who had control of the interests of the consumers.

Mr. E. K. Blyth, the Solicitor, having given a general indication of the contents of the Bill,

The Chairman moved a resolution approving of the Bill, "subject to any amendment thereto which might be made by Parliament, and approved by the Directors." He supplemented his previous remarks by saying that, in the course of the interviews with the District Councils, certain points were raised with regard to the conditions on which they were supplying gas. For instance, as to the standard illuminating power, the present minimum was 14 candles. It was asked if the Directors would increase that, and they agreed to alter the minimum to 15 candles, on condition that the Bill went through Parliament as an unopposed measure. They had also agreed to have clauses inserted, to provide for the thorough and efficient testing of the gas for sulphur compounds. They had further agreed to a clause (which was unusual, but which they did not fear) limiting the amount of ammonia in the gas. These were the only points that had been raised so far; and, these having been approved by the Councils, he thought they could count upon the Bill being unopposed on the gas side. It must be understood that the Bill as drafted would not necessarily be the Bill as passed. The resolution said "that the same be approved, subject to any amendment thereto which might be made by Parliament, and approved by the Directors." There were one or two points with regard to the best arrangement as to the consolidation of the "B" and "C" stocks, on which there would have to be some variation in the clause as drafted. Then they were asking for borrowing powers equal to one-third of the amount of the capital; while the general rule of Parliament was one-fourth. The Directors, however, felt the Company were sufficiently strong to issue 33 per cent. instead of 25 per cent.; and the more cheap money they could get out in this way, the better for both consumers and shareholders. It was possible that Parliament might differ from them in this respect; but he did not think they would. There might be some modifications in the Bill; but the Directors would be careful to see that no interest of the shareholders was sacrificed.

Mr. J. Warren seconded the motion.

Sir Henry Cartwright, in supporting it, remarked that the shareholders must not think the Directors had pressed upon the Local Authorities the proposal to supply electricity. There appeared to be a desire for electric lighting in the district; and feeling that the Company could supply it on better terms, and with less risk to ratepayers than any extraneous body, the Directors intimated to the Councils that, upon certain conditions to be agreed upon, they would be willing to apply for the power to furnish it.

A little further information was given by the Chairman in reply to questions; and the motion was then unanimously carried.

The proceedings terminated with a vote of thanks to the Board.

BIRMINGHAM GAS-WORKS EXTENSION SCHEME.

The Committee's Recommendations Adopted.

At the Meeting of the Birmingham City Council last Tuesday—the Lord Mayor (Mr. C. G. Beale) presiding—the Gas Committee submitted their report (noticed last week) proposing a considerable extension of the gas-works, at an estimated cost of £366,000.

Alderman Pollack, in moving the adoption of the report, said that when, on Feb. 2 last year, the Committee obtained permission to duplicate the water-gas plant, he explained that it would be their duty to bring before the Council a matured scheme for increasing the coal-gas plant. The consideration of plans had taken longer than was anticipated; but the Committee had also hesitated because they were anxious to see whether the immense increase in the consumption of gas which took place last year would be maintained, or receive a check. To the end of December, notwithstanding the very mild weather and considerably reduced business activity in the last six months of the year, there had been a further increase of 211 million cubic feet of gas over and above the large increase of 12 per cent. in the preceding year. In an appendix to the report they showed the increase of gas consumption each year since the works were taken over by the Corporation, and also the increase each five years. It would be seen that each period of five years had shown an increase; and this was so even in the last five years, which included one year when the consumption remained stagnant, and another when there was an actual reduction of nearly 2 per cent. In 1876, at the time of the transfer, the output of gas was 2000 million cubic feet; and it had increased gradually by an average of 4½ per cent. compound until March 31 last, when it was 4800 millions. Probably it would grow from 4800 million cubic feet to 5000 million cubic feet. But the most important factor to be considered was the weekly output. This had also increased at the rate of 4½ per cent. during the last twelve years; and on two occasions it had risen to 12 per cent., while during the last financial year there was a weekly increase of 18 per cent. This was a gigantic increase, the maximum week's output from the three Birmingham works being 156 million cubic feet; while in the corresponding week of this year, when the weather was milder and trade was not so good, they reached to within 4 million cubic feet of that total. It was clear, therefore, that they were justified in assuming that the future output would grow at the rate of 4½ per cent. compound. It was their intention to build a new retort-house at Nechells which would produce 5 million cubic feet daily, and one at Windsor Street which would produce 1½ million cubic feet daily. These should be proceeded with at once, so as to be ready for the winter of 1899, when it was estimated that the maximum daily output from the works would be reached. The two houses, with the necessary plant, were estimated to cost £177,250. Until they were built, it was impossible to increase the productive capacity of those at present in use; but when they were, it would be possible to proceed with the reconstruction of the two old retort-houses at Saltley and the two at Windsor Street. The two at Saltley were built in 1858 and 1861, and those at Windsor Street about the same date. They trusted that it would also be possible at a later date to reconstruct the three retort-houses at Adderley Street, which were built in 1847, 1852, and 1857. In some of the houses, it was impossible to introduce proper machinery; and therefore the cost of manufacture was much greater than it should be. He did not exaggerate when he said that in the reconstructed houses the cost of carbonizing coal would be at least £10,000 per annum less; and this would be almost sufficient to pay the interest on the outlay with which the resolution dealt. Of course, the reconstruction must be gradual, and must keep pace with the consumption; but if the consumption continued to increase, as they believed it would, then it was possible that the work would be completed in six years. It would then be practicable to deal with the Adderley Street works, and it might be a question whether they should be reconstructed or removed. At present, however, they only asked for consent to the first part of the scheme. Alluding to the fact that a portion of the Committee's land which is used for recreation purposes will be required for the extension, he said the Committee regretted it.* They had hoped not to touch this land; but when the plans came before them, they found it quite impossible to do without it. If they did, it would cramp the works, and make the output too restricted and costly. They had to bear in mind not only the immediate necessities but the possibilities of the next ten or fifteen years, and to so arrange the works that the two sites in Devon Street and at Nechells could be worked in conjunction and economically. It might, however, be some years before the whole of the land was required. Probably about five acres of it would remain for the next five or six years. Then they hoped it would be possible to find another piece of land to replace it; and when the time arrived, doubtless the Committee would take it into consideration. Having indicated upon a large plan the situation and arrangement of the proposed new works, and mentioned that the estimate did not include railway extension and the improvement of the River Rea and the diversion of the main sewer, which would have to be the subject of negotiation with the Public Works Committee, Alderman Pollack said that probably it would be necessary to apply for further borrowing powers, although there was some margin still left of powers already granted. The Committee thought of adopting inclined retorts, which had made great advances during the last few years, rendering them the most economical and the cheapest to work; but they could not come to an absolute decision until they had agreed with the patentees as to the amount of royalties to be paid. If the royalties were too onerous, they would have horizontal retorts with stoking machinery. The subject of the competition of electric lighting was very fully dealt with in the report. When electricity first came into use, gas shares had a mighty fall. But since then a complete reaction had taken place; and in London, where the electric light had been more extensively adopted than in any other city, gas shares stood higher than they had ever done before, showing that there was no apprehension whatever as to the growth of gas undertakings. The comparative success of electricity in Glasgow and Manchester had not prevented, *pari passu*, a rapid and, he might say, an unprecedented increase in the gas consumption. In the Market Hall Ward of Birmingham, where electricity had the best chance, the decrease of 8 per cent. in the consumption of gas was being rapidly recovered, and was now reduced to 3 per cent. The total amount of electricity supplied by the Electric Lighting Company was equivalent to about 60 million cubic feet of gas per annum. Let them assume it was equivalent to 100 millions, and it would still be but a fiftieth part of the total output of the gas supply, and one-fifth of the increase in the output during last year. It was evident that the two illuminants might prosper side by side in due proportion without interfering with one another. He had been asked whether acetylene would interfere with them. Acetylene gave a most beautiful light, and was at present only in its initial stage. The chemical from which it was made was at present very costly; and the generation of the gas was not free from danger. No doubt great improvements would take place; but as far as he could see the gas was more suitable for private installations than for distribution in mains. In looking at the strides the gas industry had made during the last twenty years, it would be noticed that the cost of production had been lessened, and the quality of the gas had improved. In carburetted water gas they had a ready auxiliary, provided it was used in due proportion and with caution. For heating and cooking, gas had promoted an industry in stoves which was daily progressing. Cooking apparatus was now produced at such a price that a gas-stove was welcome in the most modest household; while the prepayment gas-meter was, he believed, at last solving the question of introducing gas into the dwelling of the artisan, and he hoped of banishing therefrom the dangerous oil-lamp. Having referred to the growth of the incandescent gas-burner and the probability of further developments in this direction, especially in the application of the incandescent system of street lighting, Alderman Pollack concluded by expressing his confidence that the proposed capital outlay would prove as

* Earlier in the proceedings, a memorial was read from the burgesses of Nechells Ward protesting against the contemplated closing of Nechells Recreation Ground in consequence of the gas-works extensions. It was signed by 1000 persons.

remunerative as the capital already invested. If the Gas Committee were open to any reproach in reference to this matter, it was in respect of their having tarried so long in bringing the subject before the Council. They wished, however, to submit a scheme which would be moderate, comprehensive, simple, effective, and economical. It was for such a scheme that he asked the approval of the Council.

The motion having been seconded,

Mr. WILSON moved as an amendment—"That the proposal to expend £366,000, in connection with the extension of the gas manufacturing plant be referred back to the Gas Committee for their further consideration." He objected to the outlay because he did not believe that further development of the gas-works at present was an absolute necessity. In view of the rapid strides that were being made by electricity, it was impossible for them to tell exactly the position in which they would be in the immediate future. If, however, the Committee had £366,000 they wanted to spend, they should erect new plant at the other end of the city, where the gas was wanted, and not at Nechells and Saltley, which already suffered sufficiently from gas-making operations. He appealed, too, on behalf of the children of Nechells, against the taking away of their recreation ground. He did not wish to dispute the legal right of the Gas Committee to take back every inch of the ground; but he asked that the Council should rise higher than that, and consider the moral right of the peop'e of Nechells.

Mr. JONES, in seconding the amendment, agreed that it was right the Committee should provide what was necessary in the way of extended works, but he appealed to them to look for land upon which to build other than the Nechells Recreation Ground.

Mr. LANE said he did not exactly know what Mr. Wilson intended by his amendment; and therefore he should move one of his own—"That the recommendation of the Committee relating to the extension of the works be referred back for reconsideration." The report, he remarked, was a very serious one; and it should be very carefully examined. He found from the reports of the Committee that, during the last four or five years, they had submitted a number of heavy items of capital expenditure. In the year ended October, 1892, items of capital outlay were submitted for approval amounting to £16,500; in 1893, the amount was £19,800; in 1894, £5600; in 1895, £25,000; in 1896, which was a phenomenal year, £76,000; and in the year just ended, the Council had authorized items amounting to £119,000. It seemed to him the Committee had been dealt with very liberally. In 1896, £60,000 was voted for carburetted water-gas plant, and last year £43,000—the plant being equal to an increase of 25 per cent. in the productive capacity, which, in his opinion, ought to be sufficient for five or six years. What they had to deal with was not the total production of the entire year, but the maximum weekly output, which would be found to have been stationary, or even retrogressive. He was afraid capital outlay was going on at a rate in excess of the increase in the demand for gas. He thought that at the present time some addition in the way of inclined retorts would suffice the Committee in times of pressure during the winter months. It seemed to him a gross waste of public money to destroy £60,000 worth of old retort-houses.

Mr. TOLLER supported the amendment. For his part, he did not see that they wanted a new retort-house for another ten years, if the old retort-houses were put into good working order, which they were not at the present time. In two of the retort-houses at Saltley, there were two benches of retorts which had not been worked for ten years. If these were put in good working order, they would produce 7 million cubic feet of gas a day, instead of 5 millions. With the addition of the water-gas plant and improvements in the existing coal-gas appliances, they could go on for another ten years. This would enable them to see what progress would be made with the electric light, and would save the Nechells playground. If ultimately new works were necessary, they might be advantageously provided somewhere in the locality of Selly Oak.

Mr. LANCASTER agreed that the report should be referred back. There were several points on which the Committee appeared not to have made up their minds. There was no reason why they should have brought forward a proposal for capital expenditure extending over five years; they might have been content with submitting their requirements for a year at a time. What seemed to him to be most needed was not additional producing plant, but additional storage, which would enable the Committee to meet the demand of the two heaviest weeks in the year.

Mr. J. H. LLOYD said there were two questions for consideration—viz., Were the proposed extensions necessary? and, secondly, Was the method suggested by the Gas Committee the best one? There had been no serious opposition to the proposal for the extension of the works; and he might take it that the Council were satisfied upon that point. The Committee had taken the Council very fully into their confidence in the report they had presented; and, so far from the matter being "rushed," the Committee had devoted many months to the consideration of the subject. With regard to their using the land at Nechells, he would remind the Council that the ground was appropriated for gas-works by Act of Parliament, obtained after notice sent to every owner of property within 300 yards of the boundary. Houses that had been erected since were put up with full knowledge of the destined use of the land. The Council could not legally alienate the ground from the purpose for which it was acquired. The ground would not be taken back all at once; and meanwhile the Baths and Parks Committee should at once take steps to find a more suitable site. Referring to the remarks of Mr. Lane about pulling down retort-houses that had cost £60,000, he would remind them that these houses were at least forty years old, and were scarcely safe. As to the unused retorts at Saltley, Mr. Toller would find that there were only about fifty.

The TOWN CLERK said Parliament would be very unlikely to give them fresh land for gas-works purposes while they still had that at Nechells.

Mr. HUNT supported the amendment with a plea on behalf of the children of Nechells.

Alderman WHITE said he shared in the regret expressed at the taking back of the land; but it had been fully known that it was only a loan. He hoped the outcome of the discussion would be that the district would acquire a much better ground, and that the Gas Committee would give the Baths and Parks Committee financial help in that direction.

Alderman MANTON deprecated the proposal to send the report back; observing that, if the projected outlay increased the revenue by no more than £12,000 per annum it would be fully justified.

Alderman COOK suggested that the £55,000 which the Committee sought for the current year should be voted, but that the question as to the further proposed outlay be left open pending an arrangement with the Baths and Parks Committee whereby Nechells would be provided with a playground. At the same time, he did not think they were extravagant in asking the Council to look forward five years.

After further discussion in regard to the land at Nechells,

Mr. STEMBRIDGE moved, as a further amendment—"That £55,000, the amount asked for by the Gas Committee for 1898, be voted, and that the remainder of the £366,000 stand over until some arrangement has been made either for the retention of the present recreation ground or some other suitable land provided for that purpose."

Alderman BAKER seconded this amendment.

Mr. JARVIS, advocating the course proposed by Mr. Wilson, said it must be borne in mind that if they voted the £55,000, they would be practically committing themselves to the whole scheme.

Sir JAMES SMITH said that he thought the question was one entirely of confidence in the Gas Committee. He thought they had done well in the past; and considering they had saved the rates to the extent of half a million, they were fully deserving of confidence.

Alderman POLLACK, in replying to the discussion, said the Committee had every sympathy with those who desired to retain the Nechells Recreation Ground. They had thought the matter out quite as much as the representatives of the ward had, and they were most reluctant to take the park. If the scheme was not passed, a great responsibility would fall on the Council. Alderman Cook did not quite understand the question in suggesting that £55,000 only should be voted. They did not intend to spend more; but the £55,000 was part of the whole scheme. Therefore, if they accepted the last amendment, they would practically pledge themselves to adopt the whole scheme. It was a moderate scheme, and one that was absolutely necessary. With regard to the Nechells Recreation Ground, the Council had not quite understood what he stated. Five acres of the land would probably remain untouched for five, and perhaps for seven years; and therefore the best part of the ground would still be available for recreation purposes, and in the meantime they could look out for another site. If the Committee had the power by law, they would purchase a much better site than the present one. With regard to acetylene gas, it was at present in its infancy; and it certainly would never interfere with the coal-gas supply.

The LORD MAYOR ruled Mr. Lane's amendment out of order, as the principle of it was contained in Mr. Wilson's; and, in view of Alderman Pollack's explanation, Mr. Stembridge withdrew his amendment.

The first amendment was then submitted; 23 voting for it, and 41 against. The report was thereupon approved.

BELFAST CORPORATION GAS SUPPLY.

Reduction in Price—The Question of Discounts.

At the Meeting of the Belfast Corporation last Tuesday, a discussion took place on the question of the price of gas.

Alderman DEMPSEY proposed that, from Jan. 1 last, the price of gas be reduced to 2s. per 1000 cubic feet. He said he had intended to move a further resolution that the discounts be equalized on the quarterly consumption to 20 per cent. if the payment for same be made within a month of the expiry of the quarterly account. He complained that members of the Council had not had an opportunity of seeing a question submitted to Counsel by the Town Clerk, the reply to which precluded him from moving the second resolution which he had mentioned. They were told that, by a certain clause in one of the Acts, these graduated discounts were made binding. He proceeded to discuss the accounts of the Gas Committee, and said that they ought not to oppress themselves for the benefit of posterity. The reduction of 3d. in price which the Corporation made last year had resulted in additional consumption, representing an increase of about £13,000 during the year. The average price for gas would be a mean between 1s. 7d. and 2s. It was said that they made £50,000 last year; that was a dishonourable boast. (Laughter.) He held they were within measurable distance of having to deal with this matter in some of the Courts. He urged the Corporation to reduce the price, and thus spread more light through the streets, and induce householders to use more gas than they were inclined to do because of its high price.

Mr. HARRISON, in seconding the resolution, agreed with the mover that they were charging too much for their gas. He maintained that they were taking from the poorer class of the community a very large quantity of money, and using it for the purpose of making gigantic profits.

Mr. YOUNG said if the resolution were passed, it would be a loss to the ratepayers as against the gas consumers; it would be to the advantage of a few who burned gas in the city, and to the detriment of the ratepayers generally. The price was as low as in any part of Ireland; while its quality would compare favourably with that of gas supplied in England. Owing to the reduction that had already been made, and from other causes, there had been a depreciation or loss in the quarter ended Dec. 31 last of £5000—that was, the profits from gas for the quarter were £5000 less than for the corresponding period in the previous year.

Mr. HARRISON asked the Chairman of the Committee if that were a correct statement.

The CHAIRMAN: I believe it is true; but I will ask Mr. Stelfox.

Mr. J. STELFOX (the Gas Engineer) said the reduction in profits was £4800.

Mr. ANDREWS moved, as an amendment, that the price of gas be fixed as from Jan. 1 at 2s. 3d. per 1000 cubic feet.

Mr. W. M'CLURE seconded the amendment. He regretted that the root of the evil—that was, the inequality of treatment in the matter of discounts—could not be dealt with that day. He held that a grievous injustice had been done to the working people, who derived no advantage of reduction at all. They had no right to legislate there for any particular class.

Alderman Sir JAMES HASLETT said that the old Corporation thought it wise that a precarious undertaking such as the gas-works should be fortified with a substantial sinking fund. In the original purchase they had some £130,000 or £135,000. This represented good-will, and had no representation whatever in plant. The Corporation thought that, until the sum was wiped out, no reduction whatever should be considered. It was clear that the gas undertaking was a precarious one, because they

had the Electric Lighting Department running in keen competition with it. But for the care of the Corporation in developing the stove business, the consumption of gas would have been smaller than it was. The proper position for the Corporation to take was not to deal with the reduction at present, as that would practically stultify them when they came to consider the larger question of discount rates. They might abolish entirely the differential discount, and give, if need be, in cash when the account was paid within a month, a reduction of 2½ per cent. He suggested that the matter be referred to the Law Committee, for the purpose of promoting a short Bill; and he believed it would be a non-contentious measure.

Mr. J. M'Cormick agreed with Sir James Haslett that a Bill should be promoted to grapple with the question thoroughly.

The Chairman said the Committee had spent the profits in new mains and matters of that kind; and if the Council did away with them, they would have to go to Parliament for powers to borrow money. He hoped the Council would pause, and not think of reducing the price.

The amendment was carried by 27 votes to 13; and, on being put as a substantive motion, was adopted.

DARLINGTON CORPORATION GAS SUPPLY.

Erection of Water-Gas Plant to be Postponed—Electric Lighting v. A New Gasholder.

At the Meeting of the Darlington Town Council last Thursday, the above questions were under consideration. In the first place, the following motion was on the *agenda* in the name of Alderman Harding: "That the minute passed at the special meeting of the Council, held on Dec. 17 last, relating to the laying down at the gas-works of a plant for producing carburetted water gas, be rescinded." The Gas Committee had, however, passed the following minute: "Carburetted Water Gas—A communication from certain medical practitioners in the town on the question of adopting the process of carburetted water gas is considered;* and although the Committee are satisfied from the inquiries they have made that the danger to the public in using a mixture of 25 per cent. of carburetted water gas with coal gas as supplied by them to consumers is greatly exaggerated in such communication, and that such a mixture might be consumed without increased danger, yet, in view of the adverse opinion, they feel that it will be better to postpone the erection of the plant for the present."

Alderman Barron suggested to Alderman Harding that the Committee's minute met all that was necessary for the present.

Alderman Harding said he gave notice under the idea that, had the Council had before them the statement of the whole of the rate-paying medical men in the town with one exception, they would not have passed the resolution of Dec. 17. The Gas Committee themselves had not recommended the rescinding of the resolution; therefore he thought it due to those who had mentioned the matter to him, to proceed with his motion. He took it that Alderman Barron and the Committee were entirely of the same opinion that day as before the medical protest; and that their minute was in deference to the report of the medical men, and the wish of the general public. All he asked was that they should go a little further; for he saw that, after recommending postponement, they, nine days afterwards, proposed that a deputation should visit Tynemouth for the purpose of inspecting the Whessoe-Munich carburetted water-gas apparatus at present in use in that town.

Alderman Barron explained that it was not a water-gas process; but one for enriching gas by breaking up oil; and they had referred it to the Medical Officer for his opinion as to its safety.

There was no seconder to the motion; and the minutes of the Gas Committee then came forward for discussion.

Alderman Barron thanked the Council for the position they had taken up on Alderman Harding's motion. Speaking of the protest by the medical men, he said it was curious they heard nothing of this protest when the Committee proposed, under their Bill, to take power to put down the plant. He had reports from experts which ridiculed this memorial. He questioned very much whether any one of the protesters had made an analysis of the gas. Alderman Barron quoted authorities and also read extracts from the "Journal" in justification of the action of the Committee in recommending the adoption of the process. As a matter of fact, he said, if they had mixed 25 per cent. of carburetted water gas for the purpose of enriching the ordinary gas, it would then have contained a lower percentage of carbon monoxide than the coal gas sent out by some of the Scotch gas-works. However, a feeling of alarm had been aroused in the town; and the Committee, without changing their views, determined they would defer the question until (say) the Departmental Committee reported, or they had other experience to guide them. It was difficult to know what other experience they needed. Middlesbrough, Stockton, and other towns were using water gas; and there was no indication that the health of the people was being lowered, while in the works where it was produced, the men did not in any way suffer. However, the Committee would not take any steps without first coming to the Council, and as it would occupy six months to put down the plant, ample opportunity for opposition would be given. Alderman Barron next explained the Whessoe-Munich process of enrichment, which he said the Committee would no doubt use if the report of the Medical Officer were satisfactory. The Committee had also passed a resolution recommending that an Electrical Engineer be engaged to advise as to the best system of electric supply to adopt for the lighting of the borough, and to prepare plans and specifications for the installation of the electric light; and that in the meantime no further steps be taken towards the erection of a new gasholder. Alderman Barron explained that Mr. Hawksley had advised them to put down a large new gasholder. The decision to proceed no farther was carried by a small majority, and they felt that they should have the advice of a man of the standing of Mr. Hepworth before they flew in the face of Mr. Hawksley's recommendation. Mr. Hepworth might be able to suggest a makeshift process to avoid the risk of breaking down in their position as providers of the light, heat, and to a large extent the motor power of the town. He (Alderman Barron) was anxious for the success of an instalment of electricity; but he did not think it would interfere with the consumption of gas to such an extent as to render precaution necessary.

Mr. Meek, in seconding the motion, considered that, from the point of view of safety, the gas storage should be increased.

After further discussion, an amendment was carried modifying the minute by the inserting, after the words "electric light," "but that the Borough Surveyor be instructed to confer with Mr. Hepworth or other suitable expert, and arrange for him to meet the Gas Committee and discuss the position of the town in relation to the gas supply."

The minutes, as amended, were adopted.

* The text of this communication was given in the "Journal" for the 11th ult., p. 84.

BRADFORD CORPORATION GAS, ELECTRICITY, AND WATER DEPARTMENTS.

Some Interesting Figures.

The City Accountant of Bradford (Mr. G. A. Thorpe) has issued his annual volume dealing with the accounts of the several Corporation departments for the year ended March 31 last. It is rather late now to refer to these accounts; but we may extract a few striking figures relating to the undertakings in which the "Journal" is interested. The gas-works accounts show a gross profit of £42,264, against which the Council have paid the charges for interest on loans and for sinking fund; leaving a net profit of £13,584. This is in addition to the lighting of the streets gratuitously, which absorbs about £20,000 per annum. It is interesting to note that the total profits made by the gas-works since they were purchased by the Corporation amount to no less than £417,314, in addition to the advantage of the abolition of the lighting rate, which was levied until 1878. From the profits, the Council have from time to time voted mainly in relief of rates a sum of £372,000; leaving profits still to be disposed of to the amount of £45,314. Out of the £372,000, the accounts show that £5000 has been set aside to form the nucleus of a fire insurance fund; and a similar sum has been voted during the present financial year. The electricity works accounts show a net profit of £6225, after payment of interest for sinking fund. Since the works were established in 1891, the net profit has been £14,782, against which a sum of £4622 has been written off for depreciation of plant and machinery. The profits unappropriated amount to £10,159. On March 31 last there existed an excess of assets over liabilities of £23,166. The water-works accounts show the substantial loss of £7159. This is evidently due to the large amount which the Corporation have had to pay as interest on the loans in connection with the new water-works. From this cause arose the necessity of laying a rate of 2d. in the pound which was levied at the commencement of the present financial year. This is the first water-rate which has been laid since 1890.

INSTALLATION OF WATER-GAS PLANT AT PLYMOUTH.

In order to meet the continually increasing demand for gas, the Plymouth and Stonehouse Gas Company have put in an installation of water-gas plant. Provision was made for it in the No. 1 retort-house and the adjoining coal-store, which have not been used since the new house, fitted with West's charging and drawing machinery, came into operation. These old buildings have been easily adapted for the new purpose to which they have been put, and, after undergoing little alteration, have accommodation for the new apparatus as well as for a duplicate set. The oil-tanks, a supplementary gasholder, and the station meter are located in the coal-store, from which the roof has been removed. Each of the three tanks holds 700 tons of oil; making a total of 175,000 gallons. The oil is brought in tank steamers to a wharf 200 or 300 yards from the gas-works, and is pumped through a 6-inch pipe, which has been laid for the purpose, direct from the ships into the tanks. In the engine-house all the machinery is in duplicate. The engines operating the blowers are of 20-horse power; and there are also double sets of oil and circulating pumps, as well as pumps for the feeding of the boilers, and an additional set for drawing water from the gasholder tanks for use in the event of a temporary failure of the Corporation water supply. Steam is supplied by two horizontal boilers fitted with Meldrum's patent furnaces. There are two sets of generators, each having a productive capacity of 750,000 cubic feet in 24 hours; the daily consumption being about 3 million cubic feet. The gas is drawn through the old exhauster into the oxide purifiers, and is stored in a relief gasholder having a capacity of 750,000 cubic feet, before it passes into the ordinary holders to become part of the town supply. Since the plant was laid down, gas of 16¼-candle power has been regularly sent out; the statutory requirement being 15 candles. The plant was supplied, according to designs and specifications prepared by Mr. John West, the Company's Engineer, by Messrs. Samuel Cutler and Sons, of Millwall, with the exception of the meter, which is by Messrs. Willey and Co., of Exeter. At present the plant is being worked by the makers, and has not been formally taken over by the Company.

THE ASSESSMENT OF THE TYNEMOUTH GAS-WORKS.

A Large Increase.

A dispute has been going on between the Tynemouth Gas Company and the Assessment Committee of the Tynemouth Union in regard to the rateable value of the Company's works. It appears that these had not been valued for assessment purposes for a good many years; only £160 having been added to the net rateable value between 1871, when new works were erected, and 1896. On the re-valuation taking place, the Company were quite prepared to admit that there was a considerable increase; but they were greatly astonished to find that it was from £2471 to £5309. The Directors went carefully into the matter; and, having satisfied themselves that so large an increase was unfair, they determined to contest it if they could not get a considerable reduction. They obtained the assistance of Mr. T. Newbigging, who valued the works, and put the

net rateable value at £3548. This figure was submitted to the Committee, and supported by Mr. Newbigging, as well as by Messrs. Williamson, Carr, and Hardie, the Company's Chairman, Secretary, and Engineer. As the result, the Committee, on the advice of their Assessor (Mr. Hedley), agreed to reduce their figure to £4500. Mr. Newbigging was of opinion that a much larger reduction should have been made; but the Committee's valuation was accepted, as the Directors did not wish to incur the trouble and expense of an appeal. In connection with this matter, it may be of interest to give a few figures showing the progress of the Company since the previous valuation. In 1871 the capital expended on the works amounted to £62,050; in 1896, to £79,822—an increase of £13,772, or at the rate of 22 per cent. As already mentioned, new works were erected in the first-named year; and therefore only a comparatively small outlay has been required since. The receipts for gas in 1871 were £10,735; in 1896 they were £24,741—a difference of £14,006, or at the rate of 131 per cent. increase. The profits for the two years named were £3585 and £6675—an increase of £3090, or at the rate of 86 per cent. The most noticeable advance, however, was in the make of gas, which rose from 77 millions in 1871 to 260 millions in 1896; being an increase of 183 millions, or at the rate of 237 per cent. In 1871 the net rateable value of the undertaking was £2311; it was now (as agreed) £4500—the difference being £2189, or at the rate of 94 per cent.

THE PURCHASE OF THE YSTRAD GAS AND WATER WORKS BY THE LOCAL AUTHORITY.

The Umpire's Award.

Our readers will doubtless remember that the Ystradyfodwg Urban District Council obtained parliamentary authority in the session of 1896 to purchase the undertaking of the Ystrad Gas and Water Company. The question of acquiring the works had been under consideration at various intervals for some years, and steps were taken in 1890 to obtain possession of them; but the Local Government Board withheld their consent. Since then the relations between the Company and the Local Authority have not been of the most amicable nature. Complaints were made of the water supply; and five years ago the Ystradyfodwg Local Board brought an action against the Company for sending out impure water. They were, however, unsuccessful in their attack; the case being dismissed with costs. Two years later the parties were engaged in an arbitration before Sir B. Baker on a question of deficient supply. But he practically exonerated the Company from blame, as the failure complained of occurred through the inadequacy of the Company's statutory powers; and he ordered the costs to be divided. Towards the close of 1895, the District Council gave notice of their intention to promote a Bill to enable them to purchase the Company's undertaking and construct additional works. At the same time the Company announced that they purposed seeking power to raise additional capital for carrying out new works. These two Bills came before Parliament in due course, with the result that the latter was rejected. The passing of the Council's Bill put them in possession of the long-sought powers of purchase; for by section 6 it was provided that they should within six months give notice to the Company of their intention to buy, and the Company were to sell their undertaking at a price to be agreed upon or determined by arbitration. The notice was accordingly given; and, as the parties could not agree on the price, arbitration was resorted to. Mr. Corbet Woodall, M.Inst.C.E., acted for the Council; Mr. C. Hawksley, M.Inst.C.E., for the Company—Sir F. J. Bramwell, Bart., F.R.S., being the Umpire. The arbitration took place a few months ago; and the proceedings were reported in the last volume of the "JOURNAL" (pp. 1013, 1070, 1124). The Arbitrators, however, failed to agree; and they gave notice to the Umpire to this effect on the 14th ult. The Arbitrators and Umpire thereupon visited the works, as arranged at the arbitration; and on the 24th Sir F. Bramwell made his award, which was taken up by the Council last Wednesday. He decides that the price they are to pay for the undertaking is £231,364—being £126,049 for the gas-works, and £105,315 for the water-works. They take over the Company's debentures, in accordance with the provisions of the Act; and they are to pay for the stores, fittings, &c., the value at which they stand in the books on March 31 next (the date of transfer), as well as the taxed costs of the arbitration. The Company originally asked £364,000, and subsequently £347,000, for their undertaking. The purchase was made on the Company's accounts for 1896. These show that the paid-up capital at the close of that year consisted of £40,000 of "A" (10 per cent.) stock and £64,663 of "B" (7 per cent.) stock—the latter total being inclusive of premiums; and £25,000 had been raised on debentures at 5 per cent. out of £37,500 authorized. The total capital was therefore £129,663. At the same date there had been expended on the gas undertaking £59,277 (£3304 in the twelve months covered by the accounts), and £72,918 (£471 in the twelve months) on the water undertaking; making a total of £132,195, or £2532 in excess of the receipts. The balances carried to the profit and loss account were £6222 in respect of the gas, and £4307 in respect of the water undertaking—together, £10,527; and there was a sum of £6823 available for distribution. Owing to the heavy legal expenses the Company have had to bear in defending themselves, they have only just managed to pay full dividends for the last two years (from 1891 to 1895 the dividends were 9 and 6 per cent.); and the reserve fund at the close of 1896 amounted to only £500. The "A" shares were quoted at 20, and the "B" shares at 17½, up to a few months ago. Reference has already been made to the inharmonious relations subsisting between the Local Authority and the Company; but it should be mentioned that the complaints of the former were solely in regard to the water supply. They found no fault with either the quality or the quantity of the gas supplied; and, as a matter of fact, they were not desirous of buying the gas-works. But the Company naturally declined to entertain any proposition to dispose of one section of their undertaking only. Now that the District Council have it in their own hands, it will be interesting to watch its progress under the management of Mr. Octavius Thomas. There is at present a constant service of water, introduced by the Company two years ago; and arrangements are being made to bring in an additional supply from Llyn Fawr, near Rhigos, a few miles from Hirwain, by tunnelling the mountain at Blaenrhondda, which is at the extremity of the valley, about 13 miles from Pontypridd.

SWADLINCOTE GAS-WORKS PURCHASE ARBITRATION.

Westminster Palace Hotel.—Tuesday, Jan. 25.

(Before Sir GEORGE B. BRUCE, *Umpire.)*

This was an arbitration held under an Act obtained last session, for the purpose of fixing the amount to be paid by the Swadlincote Urban District Council for the undertaking of the Swadlincote Gas and Coke Company, Limited.

Mr. CORBET WOODALL, M.Inst.C.E., was Arbitrator for the Company; Mr. E. H. STEVENSON, M.Inst.C.E., acted in a similar capacity for the District Council. Mr. CLAUDE BAGGALLAY, Q.C., and Mr. MOON appeared for the Company; Mr. BALFOUR BROWNE, Q.C., for the Council.

Mr. BAGGALLAY, in opening the case, referred first to the sections of the Act relating to the purchase, and then proceeded to give a short history of the Company, which was formed in 1859, as a limited liability concern, in pursuance of resolutions passed at a public meeting of ratepayers and inhabitants of the town. The Company had never applied for or obtained either a Provisional Order or an Act of Parliament; and the undertaking was now registered under the Companies Acts. The shares had always been held locally; and the concern had been a steadily increasing success. The Company were not subject to any parliamentary restrictions, and so their powers of charging for gas and of dividing their profits had been unlimited. Their obligations as to illuminating power, &c., were purely those which were imposed by a Company anxious to develop their business and do their best for their consumers. The power to open roads they had never had in a strict legal sense. But practically the Company had always possessed it; for during the whole course of their existence they had never had any difficulty in this respect. The original capital was £3000; and in 1876 a further £750 was raised. Until 1881, the Company, instead of dividing all their profits, put a considerable portion of their revenue into works, and then subsequently issued £3750 in shares by way of bonus to their shareholders—thus doubling their capital. In 1886, they issued £1000, and in 1891, £1750, as share capital; and the money was actually received for these two issues. These sums made a total of £10,250. At the time of the allotment in 1881, there was a balance of £1105 in hand; and the Company also had a reserve of accumulated profits of £3036—making £4141 which might have been divided. In respect of the 1886 and 1891 issues, £1440 was received as premiums. The only other capital item was £1500, which was borrowed in 1895 at 4 per cent. This was still owing; and it would have to be paid off by the Company. The total amount of the capital was £13,190; and at the end of 1896 the accounts showed a capital expenditure of £565 in excess of that sum.

Mr. BALFOUR BROWNE remarked that the capital expenditure indicated would probably be correct but for the fact that it allowed nothing for depreciation.

Mr. BAGGALLAY (continuing) said this £565 the Company might also have divided as profit among their shareholders. With a view to showing the business done, he might mention that in 1886 the sale of gas was 9,042,200 cubic feet; whereas in 1896 it was 18,705,700 cubic feet, which gave an increase of 7½ per cent. per annum compound. So satisfactory was this considered by the District Council, that when they were before Parliament they estimated, for the purpose of fixing the period of repayment of the purchase-money, that the Company were likely to double their business in seven or eight years. The capital expended per million cubic feet of gas sold was £783 in 1892 and £735 in 1896; the capital expended per ton of coal carbonized was £5 13s. 6d. in 1892, and £5 6s. 9d. in 1896. These figures were very satisfactory, and would favourably compare with even larger businesses. As to the receipts, they increased in 1896 more than £300 over those of the previous year, though a reduction in the price of gas was made. In that year the dividend declared was 12 per cent. on the paid-up capital; but he should be able to show that the profit lately made could not only be earned but increased by economies which could be effected—for instance, by the construction of a siding to connect the works with the Midland Railway, and in respect also of the disposal of the coke and ammonia. The area of supply was a very prosperous one; and, owing to the large number of mining, pottery, and other businesses carried on, it was likely to continue. The population was largely increasing; it being at the present time 20,000. The rateable value of the whole district was £58,000. The district was well suited, owing to the class of inhabitants, to use prepayment meters. These had recently been introduced, and up to the present had been taken very readily. The price charged for gas averaged 3s. 8·8d. per 1000 cubic feet; it having been reduced in 1896 from 4s. 2d. to 3s. 7d., according to the quantity used. The price of gas used for the public lamps was 3s. per 1000 cubic feet. The percentage of unaccounted-for gas had been rather high; but this was due to mining operations, the making of new sewers (with consequent disturbance of the gas-mains), and the method of metering the public lamps, of which there were 318. The works of the Company were centrally situated on a freehold site, which allowed p'enty of room for extensions; and they were close to two railway stations, with one of which siding connection could easily be made at a cost of some £200. Regarding the possibility of competition by the Local Authority, there was little to fear on this score. He went on to indicate the method his witnesses had adopted in preparing their valuations—the basis being maintainable profits. The number of years' purchase on which engineers agreed at the present time for a well-found statutory company was about 28½. This being a non-statutory Company, the figure adopted was 26½ years; the difference being allowed for what would be the probable cost of obtaining an Act of Parliament. There would be a claim for certain prospective value; for the usual 10 per cent. to cover the cost of winding up, of re-investment, and of the successful fight in Parliament last year, when the Lands Clauses Act was substituted in the Bill for the Arbitration Act; and for a small profit made on the sale of lime, which would be taken at 3 years' purchase. Then from the total figure they deducted a capital sum which it was admitted would have to be expended in order to put the works in a position to maintain their present profit and produce the prospective value referred to. In conclusion, he pointed out the fact that the district was a scattered one which was now being developed. The Company had had all the expense of laying mains to the outlying places; and they were parting with their property at the very time when

the heavy expenditure was going to become highly remunerative, owing to the rapid growth of the population on these particular mains.

Mr. *W. Cash*, F.C.A., examined by Mr. MOON, said he had examined the accounts of the Company for the year 1896, and had also made himself acquainted with their earlier accounts. He handed in a number of tables showing the results of his investigation. With regard to the 750 ordinary shares, representing £3750, issued under a resolution in 1881, he said the issue was made in the ordinary way, except that the Company, instead of having an extra distribution of profits, applied the sum in payment for the shares. The gas profits in 1896 were £1523 17s. 2d., and those realized on the sale of lime, £23 12s. 9d. Both of these figures had been agreed with the other side as the result of compromise.

Cross-examined by Mr. BALFOUR BROWNE: The average price of 3s. 8·8d. was arrived at after deducting £207 for discounts. Including this sum, it would work out at 4s. 0·84d. for private consumption. The latter figure, however, was not reliable, because included in the discounts were certain adjustments between prices. In 1895 the price of coal per ton and of gas per 1000 cubic feet went down considerably; but he knew nothing special as to whether coal was rising or falling in the market now. As to the sale of lime, this was done to oblige the local builders. He saw no reason why they should not continue to sell it. He knew the Company lost some consumers in 1896; but he could not say that several of their best customers had left them last year, and set up electric lighting installations.

Mr. *H. E. Jones*, M.Inst.C.E., General Manager of the Commercial Gas Company, examined by Mr. BAGGALLAY, said the Swadlincote Company had a great future before it, its district being an important centre of the pottery trade. The Company had about 18 miles of pipes; and the annual sale of gas was about 18 million cubic feet. He hardly knew of another case where there was so large a mileage of pipes and at the same time the prospect of such a fruitful future, because as this unproductive capital and these mains became more employed with the filling in of the area, the sale of gas must augment without any corresponding outlay for arterial mains, the mains would come into more remunerative use, the present leakage (which was rather high) would diminish, the profits would increase, and the charge would be reduced. The present average price of 3s. 8·8d. was not high compared with neighbouring towns. The land, retorts, and storage were in excess of present requirements, and the mains (the Company having been replacing old ones with others of larger capacity) were sufficient to carry the increased quantity of gas the works could now produce. The district contained precisely the population likely to take gas through prepayment meters. Hitherto the Company had not supplied the fittings; but as soon as this was done, this branch of the business would rapidly progress. He certainly anticipated greater profits in the future; and in his opinion the Company stood in the first rank of non-statutory undertakings. The difference between the value of a non-statutory and a statutory company was measured more by the risk a non-statutory company saw in applying to Parliament than by the cost of obtaining an Act; and in the present case he thought there was no risk. The works were well found, but the condensers and scrubbers required supplementing. The purifiers, though adequate in the total, were not uniform in size, and would not work with regularity; and he therefore allowed for supplementing the three smaller ones. The expenditure on repairs and maintenance had been sufficient to cover the outlay; but the Company would have done better, and produced more profitable results, if they had spent more under this head. He had therefore added £97 to the annual expenditure for repairs and renewals. This sum was equal to 1¼d. per 1000 cubic feet of gas sold; making the allowance for maintenance and repairs 5½d. per 1000 cubic feet. This included one-third of the Manager's salary. He, however, made re-adjustments on account of coke and ammoniacal liquor. The coke sold was only 5·8 cwt. per ton of coal carbonized; and he knew it was merely a matter of repair to the furnaces, and attention, to raise the coke to 8 or 9 cwt. per ton—the normal quantity in works of this sort. At 8 cwt. per ton the increased income would be £132. At an outlay of £300, the ammonia could be converted from its present rough, unpleasant state into a valuable salt, the sale of which, after allowing for interest on the capital, &c, would produce another £59. There was nothing whatever in the nature of speculation about either of these items, for what he was proposing was done at many other gas-works. He had made a structural valuation of the whole concern, amounting to £20,071; showing that a very much greater amount must have been expended upon the works than was represented by the books. His impression was that when built they probably cost more than was put down. In his valuation he started with the profit shown on the Company's statement for 1896—£1524, which, less the £97 he allowed for extra wear and tear, reduced the sum to £1427. To this he added £132 for increased return from coke, £59 for increased return from ammonia, and £34 which the Company could save by making a siding connection with the Midland Railway Company—making together £1652. If this were a statutory Company, the right multiplier would be 28½ years; but as it was a non-statutory one he took off two years. Applying 26½ to the £1652 gave £43,778. To this he added £2943, the deferred value of the surplus works (£3586); making £46,721, which, *plus* £4672, the 10 per cent. allowance for compulsory purchase, produced £51,393. The profit on the lime (£23) he capitalized at three years' purchase, £69, which with the £51,393 made £51,462. Then he made a deduction of a sum in respect of the present deficiency in the scrubbers, condensers, and purifiers, which he considered ought to be expended in order to make the works fit to maintain the present profit. This sum he put at £605. Subtracting this figure from the last brought out £50,857 as the value of the undertaking, making allowances for its prospective development. Beyond this sum, the stock-in-trade must be separately valued on the day of the transfer; and all expenditure for additional mains, services, and meters added to the distributing plant since December, 1896, should be charged for. This sum he estimated roughly at £550.

In cross-examination by Mr. BALFOUR BROWNE, witness said that in his structural valuation he took the 1¼ acres of land on which the works stood at £1000 an acre, which, though it was back land, he did not consider excessive. It should be valued not at what it cost originally, but at its present value. Even if the works had only had, according to the books, and allowing for depreciation, £12,400 spent on them, he still held their structural value to be £20,071. This was what it would cost to build them to-day. The sum which he said should be spent on wear and tear worked out to 5·57d. per 1000 cubic feet; and he adhered to this figure, though in other cases which were put it was higher. The increased sum which he said the Company could earn was £225. Asked if he thought a concern which could earn £225 and did not do so was well managed, witness replied that it was rather an awkward question; but he thought the Company would have done better if they had applied to himself or Mr. Stevenson a few years ago. He held it to be undoubtedly right to correct the income of the Company by the addition of the items for coke, ammonia, &c. He capitalized the £250 at 26½ years' purchase, which brought out £5960.

Mr. BALFOUR BROWNE: You ask Sir George to believe that this well-managed Company have had in their hands the power of turning a non-existent thing into a value of £6500, and have not done it.

Witness said he thought it hard that the shareholders should be dispossessed of it because in a particular year they failed to get it. In reply to further questions, he said he did not know that most of the works were so dilapidated that the Company contemplated sweeping them away altogether, and reconstructing new ones, nor that a plan was actually prepared for the purpose. He did know that several parts of the works were of recent date. His total valuation was £51,000.

Mr. BALFOUR BROWNE: Can you understand the Company offering in May, 1895, to sell to us for £25,000?

Witness: Only on the ground that they did not know the value of what they were selling.

You know it as a fact?—I do not; and if they did, it would only be another illustration of what some directors do.

Mr. BAGGALLAY objected to the figures of this offer being gone into; and the objection was upheld.

Wednesday, Jan. 26.

On the resumption of the proceedings to-day,

Mr. *Jones*, in further cross-examination by Mr. BALFOUR BROWNE, said he did not know that the collieries were giving up gas and using electric light. One colliery in the district in the past year had ceased taking gas. It was not true that many of the mains were too small and required relaying; 3-inch mains for a company of this kind were quite reasonable. The works were equal to a make of 400,000 cubic feet daily; and the maximum make being 120,000 cubic feet, there was sufficient capacity to provide for the next fifteen years, at 7½ per cent. increase. The maximum daily make might have been 145,000 cubic feet; but the largest quantity sent out was 120,000 cubic feet. He should take the maximum daily make as the seventh part of the maximum week. The unaccounted-for gas in 1896—18·7 per cent.—was a very large amount. With the Company's great extent of main, he should not be unprepared to find a leakage of 15 per cent.; so that one of the elements of future prosperity of the Company would be the reduction of this waste by the increased sale over the great mileage of mains. The taking of the quantity used in the public lamps by putting a meter upon one lamp, and averaging the gas registered over a number of lamps, was most unsatisfactory. He was not aware that the Company were asked, and refused, to put regulators or governors on the lamps. The retorts ought to produce, and he had taken them as producing, 5000 cubic feet each. He was not aware that 4000 cubic feet was the most that was obtained from them. In a rural place like Swadlincote, it was not necessary to have storage for more than 80 per cent. of the daily consumption. Excluding the public lamps, the net price for private lighting came to 3s. 10d. per 1000 cubic feet, which he agreed was higher than at several other places in the locality; but this he attributed to there being in the case of the present concern a very large mileage of pipes, which were not yet remunerative. If the price charged for gas was such as to prevent the development of the Company, it would affect the maintainable profit. The 10 per cent. allowance was a customary bonus given to cover the cost of re-investment. This question, witness added, was fully threshed out in Parliament between the learned Counsel (Mr. Balfour Browne) and Mr. Baggallay; and the Committee gave the Lands Clauses Act for the special purpose of securing this 10 per cent. to the Company. The profits of gas companies averaged under 1s. per 1000 cubic feet.

Mr. BALFOUR BROWNE: If you put the value of these works at £51,000, and take that out at 4 per cent., the amount you would have to earn for profit, if the Company were continuing, instead of being under 1s. would be 2s. 5d. per 1000 cubic feet?

Witness: I think that very likely just at first—carrying in the money you must pay for prospective profits, excess works, &c.; but it will rapidly decrease as the Company go on.

Re-examined by Mr. BAGGALLAY: Against his allowance of 5½d. for repairs and renewals, Field's tables gave 5 33d. for the average of twelve suburban companies, 4·81d. as the average of eight provincial urban authority supplies, and 4·44d. as the average of ten provincial companies. As to the percentage of unaccounted-for gas, it was always large in mining and straggling districts. In addition, he should say 2 per cent. of the whole was attributable to the system of measuring the supply to the lamps. As to the necessity of reconstruction, he held that the works as they stood were capable of maintaining the present profit. The largest gasholder was comparatively modern; and the greater part of the retorts and the retort-house were quite new. Further, the works were capable of increasing their output for a number of years without re-construction, except as to the purifiers, scrubbers, and condensers, for which he had allowed £550.

By Mr. STEVENSON: He should say a fair and reasonable profit for a non-statutory company to divide would be 10 per cent. He might be asking here 15½ per cent. as the year's profit reckoned upon what the Company said the capital expenditure was; but it would be much less on his estimate of that expenditure.

Mr. *Joseph Hepworth*, M.Inst.C.E., examined by Mr. MOON, gave detail evidence generally corroborating that of Mr. Jones. The production of the works could be more than doubled on the present site. The Company's buildings were all in good order, and well adapted for the purposes for which they were required. There were two retort-houses; one being comparatively new. He put the productive capacity of the retorts at 4000 cubic feet per mouthpiece, making a total of 232,000 cubic feet daily. The furnaces were badly constructed; but by a slight modification which could be provided out of revenue, they could be made to produce upwards of 5000 cubic feet per mouthpiece. The maximum make of gas in any one day in 1896 was 135,000 cubic feet. This gave a margin between the

maximum make and the capacity of the retorts of 75 per cent. Perhaps, however, 15 per cent. should be allowed for a stand-by. The rest of the apparatus and plant, taking it generally, was in good order. There was not the slightest ground for suggesting that the works were in a dilapidated state. As to the gasholders, the total capacity of which was 135,000 cubic feet, two were quite satisfactory, but one required some attention. The distributing mains varied from 9 to 2 inches in diameter; and there was also some 1-inch pipe. Over the whole 17½ miles, there were in 1896 only 711 consumers; but the number had now increased to 806. The unaccounted-for gas was largely attributable to the small number of consumers per mile of main. It was only 250,000 cubic feet per mile of main, which compared with an average over the whole country of more than 300,000 cubic feet. There were 4260 inhabited houses in the district; but only one in five at present took gas. If the population increased as expected, the prospective value was undoubtedly great. Sufficient expense having been incurred to supply a much larger population, the increased consumption of gas would pay very much better than the present sale. The mains were sufficient for three or four times the existing population. The price charged, having regard to the circumstances, was reasonable, and compared favourably with that in a number of neighbouring places, regard being had to the difference in the conditions. Speaking generally, he undoubtedly thought that the profit the Company were at present making could be maintained and increased, even on the present consumption. In his valuation, he commenced with £1540 17s. 8d., the profit for 1896, and to it added £32 4s. 3d., saving in haulage resulting from the construction of a railway siding—making £1573 1s. 11d. Then he deducted £17 0s. 6d. for correcting tar sales to 11 gallons per ton of coal, and £100 10s. 10d., the difference resulting from allowing for repairs and renewals of works and mains at 5d. per 1000 cubic feet sold, instead of 3·71d., the actual expenditure. Subtracting these two sums, left £1455 10s. 7d. To this he added £179 for increased revenue which would be derived from coke on altering the furnaces, and £52 10s. to be obtained from ammonia on erecting sulphate plant, after allowing for the cost of the plant. On examining the furnaces, he found that, owing to bad construction, they were consuming 25 per cent. of the make of coke. If the expenditure on renewals and repairs which he had allowed had been made, without any capital expenditure or structural alteration, this sum of £179 would have been available. These two amounts, with the £1455 10s., gave £1687 as the maintainable profit, supposing that the works were economically carried on. Applying 26¾ years' purchase, which he thought fair and reasonable, brought out £44,990, to which he added £71 (the profit of £23 12s. 9d. on lime sales, capitalized at three years), making £45,061. He claimed that there were 2571 yards of surplus land, which, at 7s. 6d. a yard, worked out to £964. There were also surplus retorts worth £900, and surplus exhauster to the extent of £75—a total of £1939, from which he deducted a fourth as the works were not immediately required, leaving £1454. The deficiencies in plant he calculated thus: Coal store, £204; boiler, £75; condenser, £100; washer, £150; tar-tanks, £100; purifier, £200; and gasholder, £220—or a total of £1049, which, subtracted from the £1454, left £405. Adding this to the £45,061, made £45,4666, which with the customary 10 per cent. for compulsory sale (£4546), produced his final figure of £50,012.

Cross-examined by Mr. Balfour Browne: A good deal of the waste was accounted for by the method of measuring the consumption in the public lamps. The reason the governors were not put on the lamps was because there was a dispute as to who should pay for them. The Company had not been perfectly managed; but still it had all the elements of a first-class concern. The principal fault of the management had been that the Directors had been too economical; they should have spent more in repair and maintenance of works.

Mr. Balfour Browne: Is it not that they have done the best they could with an inferior instrument, and that it all comes back to the defects of the works?

Witness: I do not think so. I believe it is want of judgment—want of competent advice. Continuing, he admitted that in a paper he once read, he stated that the price of a statutory company on transfer to a local authority varied from 25 to 28 years' purchase of the maintainable profits; and that when the Company was a non-statutory one, the number of years' purchase was less. This, however, was six years ago, and what was the fact then might very easily have been altered by subsequent events. He allowed £1939 for surplus works; while Mr. Jones's figure was £3588. As to the deficiencies, his figure was double that of Mr. Jones. He agreed that the total valuations came out at nearly the same amount. By putting the land at 7s. 6d. per yard, he valued it at £1810 an acre, against Mr. Jones's valuation of £1000. He was sure it could not be obtained now at less.

Mr. Stevenson: Do you think, as a matter of principle, when a gas undertaking is sold, and a company have for many years not been making the profit which valuers think they ought to have made—which profit could only be secured by the energy of the possessors of the works—that the company ought to have the capitalized value of those profits which will be obtained by the energy of their successors?

Witness: To an extent I think they ought to be paid for these things—where it is such a simple matter as that of the coke, for instance.

Mr. *Robert Cartwright*, Secretary to the Company, examined by Mr. Baggallay, confirmed Counsel's opening statement as to the capital. The maximum make in any day in 1896 was 145,000 cubic feet, and in 1897 135,000 cubic feet. The total actual make in 1897 was 25,006,500 cubic feet—showing an increase of 1,585,000 cubic feet over the previous year. The sale in 1897 was 19,370,200 cubic feet. The only loss of custom was in respect of two firms, who together took about 500,000 cubic feet less than in the previous year. There were 103 more consumers in 1897 than in 1896. He produced a plan of the siding which the Midland Railway Company had consented to construct on payment of £190. In 1897, the Company expended £567 2s. 5d. on mains, services, and meters; and making a deduction in respect of old mains taken up, left £442 7s. 10d. This had been spent out of revenue, and corresponded with the sum to which Mr. Jones referred.

Mr. Balfour Browne objected to evidence as to 1897 being admitted.

The Umpire said Counsel had better deal only with the 1896 figures.

Witness (continuing) said in 1894 the Company considered the advisability of making certain alterations in the retorts and retort-house; and ultimately a new retort-house and certain other alterations were made. A very small portion of the land was purchased at 2s. 9d. a yard. The Company had done a good deal in the way of reconstructing the works and relaying the mains during the last few years.

Cross-examined by Mr. Balfour Browne: Going back, not only to last year but to previous years, witness admitted it looked as if some of the larger customers were dropping off. There had been negotiations for the purchase of the concern by the Local Authority. He did not know that they were following complaints as to price; nor that new works were contemplated by the Council, except in supplement of those which were to be bought.

Mr. *Herbert Hardy*, the Manager of the works, examined by Mr. Moon, produced a plan made by his son—more for practice than for anything else—showing a reconstruction of the works. A plan already in evidence had been prepared from this. Witness's son had no instructions from the Directors to make it.

Cross-examined by Mr. Balfour Browne: The plan was shown to the Directors individually as they passed round the works. It had never been passed by the Board. The works wanted re-modelling, though not at present; and the way indicated in the plan was a good one. He agreed there should be a larger coal store, and that the condensers and scrubbers should be extended. A portion of the retort-house and the retorts themselves would have to be replaced, but not at once. The purifiers were fully worked, and should be larger. They blew occasionally; and then there was not only danger but loss. They should be replaced. One of the holders was old and practically worn out. It could, however, be used as a tar-tank. The mains generally were in very good condition.

By Mr. Baggallay: The plan, if carried out, would produce larger works than those existing, with a capacity of 300,000 cubic feet a day, which was more than double the present maximum make. He had not gone into the question as to whether the allowance on this head made by Mr. Hepworth would supply the deficiencies referred to.

This completed the case for the Company.

PROVINCIAL GAS AND WATER COMPANIES.

We commence to-day our usual notes on the progress made during the past half year by Gas and Water Companies in various parts of the country whose reports and accounts come to hand about this time.

Gas Companies.

The Directors of the Basingstoke Gas Company, in the report they presented at the annual general meeting of the Company yesterday, stated that the balance of profit and loss account for the past year amounted to £2770, out of which they recommended dividends of 10 and 7 per cent.

At the meeting of the Chester United Gas Company yesterday, the Directors reported that there had been a diminution in the gas-rental in the past half year, owing to the use of electric lighting; yet, notwithstanding this and the reduced returns from residuals, as well as the reduction in the price charged for gas supplied by meter, the accounts showed satisfactory results. The use of automatic meters is rapidly increasing, together with the demand for gas for cooking and heating purposes. The receipts amounted to £15,470; the expenditure, to £11,007—leaving a balance of £4463 to go to the profit and loss account. The balance to the credit of this account stood at £3659; and the Directors recommended the declaration of dividends at the full statutory rates on the ordinary stocks of the Company, after payment of which there would remain a balance of £159 to be carried forward.

The Directors of the Coatbridge Gas Company will report, at the annual general meeting to-day, that at the end of June last they found it expedient to reduce the price of gas to ordinary consumers from 2s. 11d. to 2s. 6d., and to prepayment consumers from 3s. 9d. to 2s. 11d. per 1000 cubic feet. This low rate has created general satisfaction among the consumers, and has not deteriorated the earning capacity to an extent that will be likely to interfere with the dividends. The sales of gas for the half year ending Dec. 31 last amounted to 45,074,671 cubic feet—an increase of 3,247,003 cubic feet over the corresponding period of 1896. The total revenue came to £7211; the profit being £1943. From this the sum of £154 is chargeable for interest; and from the remainder, added to the balance of £1974 brought forward, they have transferred £1225 to the reserve fund account; leaving £2538 at the credit of the profit and loss account to meet dividends, &c. The number of consumers increased during the half year by 249. Under the management of Mr. T. Wilson, the works and plant have been maintained in a state of efficiency. The Directors recommended the payment of maximum dividends at the rates of 10 and 7 per cent. on the old stock and new shares respectively, less income-tax.

At the half-yearly meeting of the Dorchester Gas Company to-day, the accounts will show receipts to the amount of £3519 in the six months ending Dec. 31 last, of which £2900 was for gas sold. The expenditure came to £2379; so that there was a balance of £1140 to go to the net revenue account. The balance available for distribution is £1213; and the Directors recommend dividends of 10 and 6 per cent. on the ordinary and preference capital. Notwithstanding the mildness of the season, the sale of gas during the past half year increased as compared with the corresponding period of 1896. Better prices were also obtained for residual products. The Directors have increased their storage by the erection of a new holder. The works, under Mr. Frank Osmond, have been well maintained.

The half-yearly meeting of the Grantham Gas Company was held last Tuesday, when the Directors were able to report that the consumption of gas continued steadily to increase, and the prepayment meters to give satisfactory results. In consequence of the productive power of the works being severely taxed, a new retort-house was being erected; and in order to meet the expenditure, the shareholders would be asked to authorize the raising of a loan on mortgage of £10,000. The Directors recommended the payment of dividends of 5 per cent. on the old shares and 3½ per cent. on the new shares for the half year. The accounts showed that at the present time there was a balance at the bank in favour of the Company of £3350. The report was adopted, and a resolution was passed to the effect that a loan of £10,000 be obtained at 3 per cent. interest.

At the meeting of the Newmarket Gas Company next Monday, the

Directors will report a net balance of £4344 on the working of the undertaking in the past year. Adding the balance brought forward (£1313), and deducting the debenture interest (£160), there is a sum of £5497 available for distribution; and the Directors recommend that it should be disposed of in the following way: In payment of a dividend at the rate of 6½ per cent. upon the consolidated stock, less income-tax, £3625; to be placed to an insurance fund, £600; to be carried forward, £1272. Under the supervision of Mr. J. H. Troughton, the Manager and Secretary, the works and plant have been efficiently maintained. The bulk of coal carbonized last year amounted to 4797 tons 9 cwt.; and the estimated quantities of residual products were: Coke, 4797 chaldrons; breeze, 345 chaldrons; tar, 51,781 gallons; ammoniacal liquor, 82,960 gallons.

The net profit of the Whitworth Gas Company for the past half year was £1026, out of which the Directors recommend the payment of dividends at the rate of 10 per cent. per annum on the original shares and 7½ per cent. on the "B" shares. Comparing the figures of the present report with those of twelve months ago, it is seen that there is a gratifying increase in the sale of gas. In the past half year, the gas-rentals produced £2376, as against £2173 in the corresponding period; and the receipts from residual products were £352, as against £319.

Water Companies.

The annual report of the Consett Water Company, which will be submitted to the shareholders at the annual meeting on the 18th inst., states that there has been a substantial increase of revenue; the receipts from domestic supplies being £649, and from meter supplies £1948 in excess of those in the previous year. The latter increase is largely due to the fact that these supplies were restricted during two months of 1896. After deducting the interim dividend paid in August, and payment of interest on bonds, income-tax, and management expenses, there remains an undivided profit, including £3459 brought forward, of £10,333, out of which the Directors recommend the payment of a dividend of 6⅔ per cent. per annum on the ordinary shares, which will absorb £5687, and one of 4 per cent. per annum (subject to deduction of income-tax) on the preference shares, which will absorb £677, and the carrying forward of £3969.

The accounts of the Grantham Water Company for the six months ending December last show a balance of revenue of £6370. Of this £1750 is to be applied to the payment of a dividend of 5 per cent. for the half year; leaving £4620 to be carried forward.

At the annual meeting of the High Wycombe Water Company on the 24th ult., the Directors reported a gross profit of £830, of which £688 was available for distribution. A dividend of 10 per cent. was recommended; and this was declared. A vote of thanks having been accorded to the Engineer and Secretary (Mr. J. F. Wicks), he stated that the increase in the revenue for the year amounted to something like £70. The quantity of water raised by their engine, which had been 25 years at work, had been 51,708,000 gallons, which was about 7 million gallons more than in 1896. Referring to a balance-sheet of five years ago, he found the cost of fuel was £196, whereas last year it was £157. The supply of water was unrestricted and absolutely pure. The new works in progress would shortly be completed; and he believed the results would be satisfactory.

Addressing the shareholders of the Pontypridd Water Company yesterday week, the Chairman (Mr. F. G. Evans) intimated that before the next meeting the contract for new reservoirs would be completed. The Company would then have an additional storage for 200 million gallons; and in a few days a large tank for holding a million gallons of filtered water would be ready for use. The report was adopted; and a dividend of 9 per cent. per annum on the ordinary shares and original stock and £6 6s. per cent. on the new ordinary shares was declared.

The water-rates in the half year ending Dec. 31 last of the York Water Company amounted to £9248, which was a satisfactory increase without any exceptional expenditure. The profits realized allowed of the declaration of dividends at the rates of 10 and 7 per cent. per annum on the ordinary shares, and of 5 and 3½ per cent. per annum on the preference shares.

Companies to be Removed from the Register.—The "Financial News" of Saturday, the 29th ult., contained a list of joint-stock companies to be struck off the register unless cause to the contrary is shown before the expiration of three months from Jan. 28, 1898. Among them were the following: Addingham Gaslight Company, Automatic Gas-Meter Company, Burgh-le-Marsh Gas Company, Champion Incandescent Gas-Lamp Company, Continental Oxygen Company, Gas Appliances Company, Gas Power Syndicate, Tuxford Gas Company.

The Transfer of the Kingston-upon-Hull Gas-Works to the Hull Corporation.—The Gas Committee of the Hull Corporation will complete the agreement for the purchase of the Kingston Gas-Works on March 31; and the City Treasurer and the Water Engineer (Mr. F. J. Bancroft) have been appointed to take all necessary steps for carrying on the works from the completion of the purchase until the supply from the British Gaslight Company can be obtained. The Committee have also resolved to grant an honorarium of one hundred guineas to the Water Engineer, "for the special and valuable services rendered by him to the Corporation in the purchase of the Kingston Gas-Works and the Local Government inquiry in connection therewith."

West's Gas Improvement Company, Limited, and the Engineers' Strike.—In the early stages of the dispute in the engineering trade, trouble was experienced at the works of the above-named Company, where about 250 men were employed, in connection with the importation into the premises of non-union men to take the places of those on strike. When the Company joined the Federation, immediate steps had to be taken to secure new labour; and they were very successful. They consequently filled up nearly all the places left vacant. Considerable interest was therefore taken in the proceedings of the locked-out men on the morning of the 31st ult., when they wished to return to their duties. The bulk of the men put in an appearance before the works at nine o'clock; but only about a dozen were able to resume, these being chiefly fitters and smiths. Though others will perhaps be started again shortly, they will be very few in number. The Company have orders in hand that will keep them employed for twelve months ahead; and they are extending their works.

ELECTRIC LIGHTING NOTES.

The proposal of the Bristol Corporation to borrow £23,000 for electric lighting was the subject of an inquiry last Tuesday by Colonel C. H. Luard, of the Local Government Board. The object of the Corporation is to extend, before next winter, the street lighting by electricity to the main thoroughfares leading to the suburbs of the city.

The Chairman of the Hampstead Vestry announced at last Thursday's meeting that the electric light account showed a debit balance of £37,987. The Vestry therefore decided to instruct the Finance Committee to consider the advisability of raising a loan for a further sum of £40,000, in order to meet the expenditure on capital account.

The Court of Common Council have referred it to the Streets Committee to consider and report forthwith as to the desirability of applying to the Board of Trade for a Provisional Order to enable the Corporation to supply electric light within the City from a station to be established by themselves or otherwise; and also to report as to the practicability of generating electricity from steam raised by burning the City's refuse in specially constructed furnaces in the proposed station.

Several reports were presented to the Stockton Town Council last Tuesday by the Gas Committee on the question of a combined dust destructor and electric lighting scheme; and they included an account of visits of a deputation to the Bradford, Leyton, and Shoreditch electricity works. A report by Mr. William Ford, the Gas Engineer, recommended a site within the gas-works boundary as most suitable for the purpose. The cost of the installation was estimated at £15,652. On the recommendation of the Committee, it was decided to invite plans and estimates for the scheme from six electrical firms.

The Blackpool Corporation had under consideration last Tuesday a recommendation of the Electricity Committee to expend £40,000 on the extension of the electricity works. It was urged, that development was required in consequence of the unparalleled demand for current for lighting purposes. Opposition was offered on the ground that the scheme had been hastily prepared, and that it was sought to rush it through the Council. It was further asserted that during the last five years the works had only made an average yearly profit of £220 upon a total capital account of £87,000. However, the recommendation was adopted.

We learn that the Midland Electric Light Company of Birmingham have abandoned their intention to apply for powers to light the borough of Leamington by electricity. It is stated that the reason for this is that the Leamington Corporation having notified their intention of seeking parliamentary authority for a similar purpose, the Company will be in a better position to oppose it, especially as they are already supplying a large portion of the borough with electricity, and have plant which cost £30,000 established in the town. It appears that up to now, owing to the cheap rate at which gas is supplied, the consumption of electricity in Leamington has not been sufficient to recoup the Company for their initial outlay.

The following appeared in the "Freeman's Journal" last Friday: "Mr. Cotton, the Local Government Board Inspector, recently held an inquiry at the City Hall into an application by the Corporation for a loan of £20,000 to renew the electric light cables, and carry out other works in connection with the electric lighting of Dublin. It was feared that some difficulty would be raised owing to the fact that the existing cables, for which a loan had been granted, had given out long before the time it was estimated they would last; but we are in a position to state that the Local Government Board, having considered Mr. Cotton's report, have notified the Corporation that the £20,000 asked for will be 'loaned' subject to approval of the specification and detailed estimates in connection with the new cables and works. The Corporation will therefore have financial resources so far to carry out their new scheme for an extension of the electric lighting of the streets."

The St. Pancras Vestry are experts as borrowers, and the needs of the Electric Light Department are insatiable. They recently had an advance of £8000 from the London County Council for the purchase of freehold land for an electric light station; but only half this sum has been spent for the purpose. The Vestry are now desirous of devoting the unused moiety to electricity purposes other than for the purchase of the site; but the County Council cannot be persuaded to see the force of their reasoning, and interest will have to be paid on this £4000 lying idle. An effort was made to allow this sum to be held as a part of a further advance of £10,000, and so reduce that loan accordingly. But the County Council officials are none too fast in agreeing; and, after an interview with the Vestry Clerk, the latter has advised the Committee "that the £4000 should not be dealt with now, but should be deducted off a future loan, as this course would enable the Electricity Department to obtain the loan without additional delay." One can only suggest therefore that the Department is actually in need of the money, and that the wonderful "profits" so often quoted are of little moment now, while that significant reference to "future loans" seems to indicate the anticipation of further monetary assistance being required in the near future.

Messrs. Thursfield and Gibbings, the Electrical Engineers respectively at Chester and Bradford, are the Arbitrators in a dispute between the Morecambe District Council and the old Electric Light Company; and in the early part of last week, they were engaged in hearing evidence in regard to the matter. The principal point at issue was that the District Council agreed to give £3897 for the Company's undertaking and a portion of the plant, main cables, and fittings. A deed executed in February, 1896, contained a covenant stipulating that, until the sanction of the Local Government Board and the Board of Trade had been obtained, the Company were to keep the plant in the same state of repair as at the original valuation. The Council alleged that the plant had deteriorated in value through being improperly stored and the main cables not properly looked after; the latter being stated to be now useless for the Council's system, and worth £2000 less than at the time of the valuation. In support of this contention, several witnesses were called; while on the other side evidence was given to the effect that the mains were practically as good as when originally valued, except for 10 per cent. allowance for depreciation. The proceedings lasted several hours; and at the close the Arbitrators intimated that they would personally test the mains.

For some months past the question of lighting the Victoria Embankment and Westminster and Waterloo Bridges with electric light has been under the consideration of the Highways Committee of the London County Council. It will doubtless be remembered that in July last they

prepared a scheme, which received the approval of the Council; but when they asked for the necessary authority to invite tenders for the work, the Bridges Committee brought up a report stating that the Charing Cross and Strand Electricity Supply Corporation had asked permission to lay their mains over Waterloo Bridge, and the Council acceded to the request, provided that the Corporation supplied light to the lamps on the bridge and maintained them free of cost. The part of the scheme which related to Waterloo Bridge was thus rendered unnecessary; and the whole matter was referred back to the Committee for further consideration. They have now prepared and presented to the Council a revised scheme, which, in view of the arrangement as to Waterloo Bridge, makes no provision for its lighting. They have, however, allowed for the electric lighting of the parapet lamps of the Embankment, for which no provision was made in the scheme previously submitted. By the revised scheme, it is proposed that 144 arc lamps shall be provided, distributed as follows: On the kerb of the carriage-way, land side, 28, riverside, 29; on the parapet wall, 64; on the Northumberland Avenue approach, &c., 8; on the piers adjacent to the Embankment, 5; and on Westminster Bridge and approaches, 10. The lamps on each side of the carriage-way of the Embankment are to be 240 feet from each other; those on the parapet wall, about 66 feet apart; and those on Westminster Bridge and in Northumberland Avenue approach will be placed at convenient distances. The capital expenditure for the installation will probably be about £25,300, of which upwards of £20,000 will be for the building and equipment of the generating station and the laying of mains. The probable annual cost of maintenance is put at £3509; the amount of the capital charges being calculated on the basis of spreading the repayment of the cost over a period of 42 years, the length of time allowed by the Council for repayment of loans to other local authorities for similar work.

In view of the steps that are being taken by the Leeds Corporation to acquire the undertaking of the Yorkshire House-to-House Electricity Supply Company, more than usual interest attaches to the meeting of the shareholders last Tuesday. The financial position of the concern was fully explained by the Chairman (Mr. Grosvenor Talbot). He said the amount of capital which had been raised was now £131,992—an increase of £37,372; and the Directors were also going to make another call of £1 per share at the end of this month. The total amount now expended on capital account was £161,009—an increase of £55,632. Their engine capacity was now equal to 2800-horse power. The result of the year's working showed that, after deducting £2300 for depreciation, there remained a profit of £10,703; and adding to this £392 brought forward from the previous accounts, they had £11,095 to deal with. An interim dividend at the rate of 5 per cent. per annum was paid in July last. This amounted to £2624; and they had now £8471 to dispose of. The Directors proposed to pay the same dividend as last year—at the rate of 7 per cent. for the six months; making 6 per cent. for the year. This would require £4142. The Directors also recommended that £3000 be carried to reserve, and £1329 to next account. The shareholders would see that the Directors had again pursued the policy of adding considerably to their reserve; and in one shape or another, it now amounted to £17,929. During the year the number of lamps had increased from 39,396 to 49,150—an addition of 9754. The quantity of current sold had increased from 701,409 to 833,280 units, which was an advance of 131,871 units. This was a very considerable increase; but it was by no means the limit of the annual growth they ought to have. The result of the year's working had been satisfactory from another point of view. They had had to work with a very large increase of capital; and most of their money had been unproductive until towards the close of the year. Another satisfactory feature was that the cost of production was the lowest that had ever been shown in any station in England; and he believed that this year again they would not be beaten. The total cost per unit had been 1·50d., against 1·73d. in the previous year. At the beginning of the year, the Directors reduced the price of the current from 6d. to 5d. per unit; and they were confident that this would result in an enormous increase in the demand for supply. The shareholders would doubtless wish to know what steps were being taken by the Leeds Corporation towards acquiring their undertaking. The Directors at present only knew what had been published in the newspapers; but an interview had been arranged between a deputation of the Corporation and the Directors to discuss the situation. He did not think any of them would wish to unnecessarily force the Corporation to go to the expense and trouble of getting an Act of Parliament, provided always that the monetary interests of the shareholders were not affected by any proposal that the Corporation might desire to make. The report was adopted.

New Water Supply for Rugby.—On the recommendation of the Water Committee, the Rugby District Council have resolved to proceed at once with the negotiations for the purchase of Brownsover Mill, on the River Avon, and lands adjoining, for the purpose of improving the water supply of the town.

Filey Gas and Water Works Purchase Question.—All hope of an amicable arrangement between the Filey District Council and the Gas and Water Company has not been abandoned. It was reported at a meeting of the Council last Tuesday that the Clerk (Mr. Gofton) had written to the Company on behalf of the Council offering to buy the undertakings upon the following terms: (1) The Council to pay the shareholders annuities equal to the maximum dividends on the capital subscribed and paid up on Dec. 31 last; such annuities to be irredeemable for a period of twenty years except by agreement between the parties, or by purchase in the open market. (2) After a period of twenty years, and until the lapse of the period allowed in an Act to be obtained for the repayment of the annuities, the Council may redeem the whole or any part of the annuities at the price of 28 years' purchase. (3) The Company to retain their reserve fund. (4) The Council to pay the costs of winding up the concern; such costs not to exceed £200. (5) The Company not to expend any further capital on the undertakings without the consent in writing of the Council until the date of transfer. Any capital so expended to be refunded by the Council on the date of transfer, with interest at the rate of 5 per cent. per annum. Some time ago, the Council informed the Company that they were prepared to make a fair, reasonable, and even liberal offer for the undertakings. No formal acknowledgment of this was made; but since then the Council have indirectly received an assurance that such an offer would be favourably received.

THE METROPOLITAN WATER SUPPLY COMMISSION.

Seventh Day—Monday, Jan. 31.

(*Viscount* Llandaff, *Chairman*, *Sir* John E. Dorington, Bart., M.P., *Sir* G. B. Bruce, M.Inst.C.E., *Major-General* A. de Courcy Scott, R.E., *the Right Hon.* J. W. Mellor, Q.C., M.P., *Mr.* A. de Bock Porter, C.B., *Mr.* H. W. Cripps, Q.C., and *Mr.* R. Lewis.)

The Commission sat again to-day in the Moses Room of the House of Lords.

The following are the Counsel engaged: Mr. Pope, Q.C., and Mr. Claude Baggallay, Q.C., for the New River Company; Mr. Littler, Q.C., and Mr. Lewis Coward for the Kent Water Company; Mr. Pember, Q.C., for the Lambeth, East London, Grand Junction, and West Middlesex Water Companies; Mr. Rickards for the Chelsea Water Company; Lord R. Cecil for the Hertfordshire County Council; Mr. Balfour Browne, Q.C., and Mr. Freeman, Q.C., for the London County Council; Sir R. Nicholson for the Middlesex County Council; and Mr. Gabriel P. Goldney (Remembrancer) for the Corporation of the City of London. The Southwark and Vauxhall Water Company are represented by Messrs. Bircham and Co.

On the resumption of the proceedings,

Sir *A. Binnie*, in reply to Mr. Mellor, said the Serpentine obtained its water from private wells, and the lake in St. James Park partly from a private well and partly from one of the Companies. The public gardens, he believed, had private supplies.

By the Chairman: The County Council had two storm-water outlets from their main sewers, which crossed the Lea at Old Ford; and these discharged into the Lea in times of heavy rainfall. This, however, would not be very often. In this way untreated storm-water sewage passed into the Lea. Undoubtedly the river below this point was considerably more foul than above it.

Cross-examined by Mr. Pope: He suggested that the Water Companies should be purchased by a central water authority, having jurisdiction over the entire area of Water London—say, the London County Council—that the present supply should be maintained as long as it would last, and that any supplemental supply should be drawn, not from the Thames, but from other sources. The central authority would be one on which the County Council and the other bodies concerned in the supply would be represented in proportion to their requirements of water. As the County Council would have 80 per cent. of the interest, they would make the purchase. The Companies should be purchased all at one time. Failing agreement, arbitration would have to take place; and a special arbitration clause was, he thought, necessary under the circumstances.

Mr. Pope: Why are you not content that the arbitrations shall proceed as all other municipal arbitrations have done?

Witness: I think that the complication of the question is such that it really requires a special clause.

You start then with a necessity for altering the provisions of the Lands Clauses Act in favour of the County Council?—I think it would be equally in favour of the Water Companies.

What is the complication, excepting size and number of Companies here, which does not arise in every water inquiry?—I think the evidence, as far as it has gone, is sufficient to show that there are many complications on disputed points. Take, for instance, if you purchase any one of the Companies ——

But you have said you would not?—If you purchase any one of the Companies (say, the Southwark and Vauxhall), they can only sell what they have; and you find that they have parliamentary powers overlapping other Companies. Now, the Arbitrator should have some special power to inquire into all the circumstances.

Has he not, under the Lands Clauses Act?—I am not competent to say.

Mr. Pope was proceeding to ask whether the County Council had not determined that they would not purchase at all unless a special arbitration clause were provided, when

Mr. Freeman suggested that these were legal matters which should be put to Mr. Cripps or the Chairman of the Water Committee, not to the witness, who was merely Engineer.

The Chairman upheld the suggestion.

Witness, in further cross-examination, said one advantage to the consumer resulting from all the Companies being in the same hands would be that when the large expenditure on works occurred which was inevitable in the near future, the consumers, supposing the works were carried out by a public body, although they might go on paying the same rates, would be paying off annually out of the rates the cost of the works, as in the case of the main drainage. This would be for the benefit of the next generation but one. If a rate-in-aid had to be made, it would fall upon the whole body of ratepayers. Then the general effect of municipalizing a water supply was to reduce the water-rates. The purchase of the Companies would make no difference in the quality of the water for fifteen years at least. The water-rates would probably be reduced to the lowest figure now charged. He did not think there would be a rate-in-aid. Ultimately he believed there would be a slight reduction in the charges, though at first they might be higher than at present, owing to the large extensions that were necessary. He could not say how the Companies, even though they had to incur this extra expenditure, could increase their charges. There was an idea in the public mind that purchase should take place; and nothing would stop the agitation of the public, but the getting of what they wanted.

Mr. Pope: You avow the belief that it does not matter what the Commission find—they may say it will be disadvantageous, and that the idea ought to be abandoned—but the agitation will go on just the same?

Witness: I should hardly put it in the disrespectful words you have used.

Is that not what it amounts to?—I think that is the outcome of all the inquiries since 1811. Witness went on to say that, in constructing new works, he thought the County Council would certainly have advantage over a Company, in being able to raise money more cheaply. All the legislation on London water since the Duke of Richmond's Commission had proceeded on the assumption that the Companies were to be purchased sooner or later by a public authority. The drawing of the supply from the Thames should certainly be regulated, whether in the hands of the Companies or of an authority; and the regulations should apply to

the existing state of affairs, even if they disturbed the agreements between the Companies and the Conservancy Board. For instance, he would impose an obligation on the Companies to maintain a flow of 250 million gallons over Teddington Weir. So far from the Conservancy objecting, Mr. More, their Engineer, had said that if the flow fell below 200 million gallons, the navigation would be interfered with. Witness knew that in their report the Conservators adopted 200 million gallons as the proper figure to keep to at Teddington; but this was not maintained. He did not know that the agreements between the Companies and the Conservators were based upon the belief of the latter's Engineers that the 200 million gallons had been maintained. The Balfour report recommended 250 million gallons as the minimum quantity; and he thought it should be acted upon in the future.

You propose to put upon the Companies a condition which would interfere with rights they have now of drawing water from the Thames?—I do not propose it myself. The Balfour Commission necessitates it.

The CHAIRMAN: I do not see how this condition would interfere with their rights to draw water from the Thames.

Mr. POPE: They could not withdraw any water unless 250 million gallons were allowed to pass over Teddington Weir.

The CHAIRMAN: It has not been shown to us that they cannot draw all those quantities, and yet not leave 250 million gallons flowing over.

Mr. POPE: That can be proved at once.

Witness (continuing) said the extra 50 million gallons was to maintain the continual downward flow of the river, and carry the sewage out to sea. The downward passage to the sea of any foreign matter in the river depended, not on the tide, which would merely wash it up and down, but upon water discharged over Teddington weir; and though this downflow was very small compared with the enormous quantity of water at London Bridge, still over a month (say) the effect would be appreciable. Witness was then examined at some length with a view to showing that to provide 300 million gallons a day, instead of storage to the extent of 27,000 million gallons, only storage of 15,000 or 16,000 million gallons would be required; and that therefore his estimate of the future expenditure was excessive. These lower figures were based on the idea that the flow of the river at certain times could be called in aid of the storage. Witness, however, disagreed with this suggestion, and adhered to his original figures. The supply of water from Wales would cost about £14,000,000, and would provide from 127 to 133 million gallons daily. There would be only one aqueduct, which he thought would be safe, after the experience of other similar water schemes.

By Lord R. CECIL: He recognized that it would be difficult, if the County Council purchased the water undertakings, to agree with the other Local Authorities as to selling them parts. His arguments in favour of purchase, very briefly, were: First, that it had been the policy of Parliament; and then that there were certain regulations required for the London Water Supply which could be more easily applied after purchase than before. The reason power could not be given to the County Council to enforce whatever regulations were thought necessary, was that if the Council were to try to administer the regulations it would be used as an argument that they were trying to depreciate the value of the concerns. Provided no purchase were contemplated, he saw no objection to the County Council being invested with these powers. If purchase took place, he agreed that practically there would be two bodies—the County Council and the Water Committee—to whom the duties would be delegated. Any regulation against the County Council would have to be in the hands of the Local Government Board or a Government Department. He saw a great difference between a Government Department controlling the County Council and a Government Department controlling the Companies.

The CHAIRMAN: You admit that the same regulations would be proper against the County Council, if they were the purchaser, as would be proper against the Companies if they were not bought?

Witness: I think so.

Therefore what the Council chivalrously propose to do is, first, to buy, and then to depreciate the property they have bought by enforcement of regulations carried out by a Government Department?—I think that is necessary, seeing what sources of supply there are.

Major-General SCOTT: Is not this lying at the root of the difficulty of giving the County Council power of control—that you would put them in a judicial position, while at the same time they represent the consumers who have an interest in getting everything as cheaply as possible?

Witness: You have put my idea in a very concise form.

Mr. BIRCHAM, on behalf of the Southwark and Vauxhall Water Company, said he did not propose to cross-examine, but to submit evidence first-hand of statements which had been given second-hand.

By Mr. LITTLER: The only reason he knew for the Kent Company abandoning the chalk well at Charlton was the growth of the population. It was a coincidence that it remained pure until witness's predecessor in office carried the London main sewer within 80 feet of it; but witness did not attribute to the sewer the fact that it had to be abandoned.

Counsel representing the other bodies interested intimated generally that they accepted what Mr. Pope had opened, and that they intended to call evidence on various points.

Re-examined by Mr. FREEMAN: He calculated that 90 days' storage must be provided, seeing that the whole flow of the river ran down to as little as 393 million gallons in a period of three dry months, and that a quantity of 550 million gallons a day—300 for consumption, and 250 for Teddington Weir—had to be provided. Even with a nominal 90 days' storage, sufficient for that period would not be available because some water must be left in the reservoirs. The regulations referred to by Lord Balfour's Commission as those which should be put upon the Companies—those dealing with the taking of water from the Thames and Lea—should also be put upon a public body, if they had control of the water, because the risk of taking water from these sources was so great that the matter should not be left to a single body. The administrative regulations would be carried out by the administrative body.

Mr. *H. E. Haward*, Comptroller of the London County Council, examined by the CHAIRMAN, handed in a table showing that the capital authorized and expended by the London Water Companies (including £1,500,000 recently authorized on behalf of the East London and New River Companies), up to March 31, 1897, was £20,842,252. The proportion of loan capital authorized to total capital was 45 per cent.; being much greater in some cases than others. The percentage was highest in the case of the Southwark and Vauxhall Company, 55·2 per cent.; and lowest in the case of the Kent Company, 17·3 per cent. These percentages compared with 20 per cent. in the case of the Gas Companies. Ultimately the effect of there being so much loan capital would be to neutralize to some extent the effect of the sinking fund clauses, unless the capital was remunerative.

The CHAIRMAN: One could conceive a point being reached at which the sinking fund clause would cease to be operative?

Witness: I think that point has been reached with the Southwark and Vauxhall Company. The amount of premiums realized by the Companies under the auction clauses was £502,770. The premiums which had gone to shareholders, in respect of stock taken up by shareholders at par between 1872 and 1897, totalled £1,853,288; that was calculated on the market price of the stock at the time that it was taken. The auction clauses became operative in 1878; and their effect was that, if £150 were received for £100 stock, only £100 ranked for dividend, but £150 went to the capital expenditure. The West Middlesex Company afforded a good example of the result of issuing capital at par to the shareholders. Since 1852, they had issued £832,000 of stock at par. The total amount of premiums on this would have been £728,000, which, in effect, had gone into the pockets of the shareholders. If the Company had adopted an economical method of raising the capital, the consumers would have been saved a charge of £33,464 a year, which would have enabled the Company to reduce their present rates by 13 per cent. This was all authorized by Parliament; and he only quoted it as indicating the necessity of controlling the Companies—not as a reason for acquiring the undertakings on more favourable terms. This might be taken into consideration as a set-off against the claim for back dividends. The shareholders, in addition to their full 10 per cent., had had these premiums. He did not know that Parliament intended they should; nor that Parliament knew at the time the effect of this method of issuing capital.

Can you suggest any additional form of control beyond the auction and sinking fund clauses?—No. Witness went on to say that he did not suggest that purchase could take place upon any other basis than that of the divisible income; but he said that this income had been increased by reason of the method adopted by all the Companies, except the East London, of issuing their capital at par. In the case of the West Middlesex Company, this would mean, as he calculated, that £860,750 would have to be paid more than if the capital had been issued in an economical way. He did not think that this was an argument against purchase, because it did not follow that it would not pay to buy even on the basis of the enhanced, but legally divisible, income. Against the claim for back dividends, he suggested there might be set off the amounts the shareholders had received by way of premiums in addition to their full statutory dividends.

Parliament has given them back dividends?—Yes.

You want to get one thing Parliament has given them so as to diminish another thing Parliament has given them?—Parliament, I submit, has not given these things with its eyes open.

Eighth Day—Tuesday, Feb. 1.

Mr. *Haward*, in further examination by the CHAIRMAN, said, with regard to the Kent Company, that taking the whole period from 1852 a sum of £15,500 a year had been paid in the form of dividend and interest on stock to the amount of £160,554 raised unnecessarily; and that up to December, 1896, the sum so paid was estimated at £207,398. If the capital had been raised by tender, as the East London Company had raised their capital, the back dividends would have been paid by this time. In the case of the Lambeth Company, the results were not important. The Chelsea Company had converted some 4½ per cent. preference into ordinary stock entitled to a maximum dividend of 10 per cent., and the effect had been that this Company had been able to distribute another £75,000. A certain amount of the stock was convertible in 1882; and issues of preference stock since had been converted into ordinary stock almost as soon as it was issued. He did not suggest that these operations were *ultra vires* or illegal; he simply gave them to show that the effect had been adverse to the consumers—that these were commercial companies which, of course, consulted the interests of their shareholders before those of the consumers. This showed the necessity for Parliament keeping close watch on the regulations of the Companies. As recently as 1896, the New River Company applied to Parliament for power to create £1,500,000 of ordinary share capital, not subject to the auction clauses, although these clauses had been inserted in nearly every Act since 1876—the date when they first came into use. On the representation of the County Council, and also of the Local Government Board, Parliament refused to allow this power.

The CHAIRMAN: You suggested or hinted that these profits which are issued to the shareholders should be regarded as payments for back dividends?

Witness: I think these matters should be considered in dealing with the Companies. Some effects of these operations were that the shareholders had received premiums in addition to their dividends. In the case of the West Middlesex Company, the consumers had not got their rates reduced to the extent they might have been reduced if the capital had been smaller; the time for the reduction of the rates to the consumers of the Kent Company had been postponed; and the Chelsea and Lambeth Companies had a larger claim for back dividends than they otherwise would have had. Witness handed in a table showing how the capital of the London Water Companies had apparently been raised from 1872 to 1897, from which it appeared that, out of a total capital issued during this period of £7,817,653, £3,644,117—or 47 per cent.—was issued to the shareholders at par; while only 26 per cent. was created under the auction clauses. He had been unable to ascertain how the balance of 27 per cent. had been issued, further than it was not under the auction clauses. As to back dividends, they depended on the Water-Works Clauses Act of 1847, and the Special Acts of each Company. The West Middlesex Company were the only one that had paid all their back dividends and had a reserve fund proper—which amounted to £55,225. Witness put in another table showing the amount claimed by each Company in 1880 in respect of back dividends, in the inquiry before the late Mr. E. J. Smith, and the amount allowed. The total claimed was £19,882,463 (the New River Company £15,000,000); and the amount allowed, £3,443,540. It also gave the estimated amount of dividends which the Companies (excluding the New River Company) could, in

March, 1897, claim to divide on their paid-up capital beyond the maximum or prescribed rates of dividend—first on the assumed legal position, and then on the basis of a limitation to six years. The "assumed legal position," witness explained to be the limitation of back dividends to the particular year in which each Company obtained a Special Act incorporating the Water-Works Clauses Act of 1847. The New River Company were not included, because it seemed to him that their dividends were not limited.

Mr. BAGGALLAY remarked that the New River Company did not claim, because they said there was no limit to the dividends they were allowed to pay.

Witness (continuing) said the back dividends the Companies could pay on the first basis were: Chelsea, £778,414 (equal to over 100 per cent. upon their capital); East London, £2,006,157 (also equal to over 100 per cent. on their capital); Grand Junction, £617,897; Kent, £189,736; Lambeth, £920,670; and Southwark and Vauxhall, £1,219,982. If limited to six years, the sums would be: East London, £240,878; Grand Junction, £112,135; Lambeth, £64,440; and Southwark and Vauxhall, £236,940. In the case of the Chelsea and Kent Companies, if limited to six years there would be no claim.

The CHAIRMAN: If these sums are payable out of future profits, the chance of any reduction of charge to the consumer is very remote?

Witness: Yes; that is so. These sums would increase so long as the Companies did not maintain their maximum dividend. The only reference to limiting the back dividends to six years that witness knew of was in the report of Sir William Harcourt's Committee, where it was suggested that the back dividends claimable should be limited as in the case of the Gas Companies.

Mr. LITTLER pointed out that there was a great difference in the conditions of the Gas and Water Companies; a notable one being that the Gas Companies were actively competing, which was not the case with the Water Companies.

Witness then produced a table giving the cost of management (excluding law and parliamentary expenses) in the case of each of the Companies, worked out per million gallons average daily supply for 1896-97. It showed that the cost of the management ranged very much according to the dividend paid, and that it was highest with those Companies who paid the largest dividends. It was obvious that with a Company having no direct pecuniary interest in managing their affairs economically, there was risk that this cost would increase, and that the consumers would therefore not get the full benefit to which they were entitled in the way of reduction.

Mr. PEMBER remarked that Mr. Lass's returns on the same subject gave very different results.

Witness (continuing) said undoubtedly the effect of the sliding-scale had been beneficial to both gas consumers and gas companies. There had been considerable reductions in price, though these might have been secured without the sliding-scale; and the illuminating power of the gas had been increased. The companies' dividends also had considerably risen. It would be possible to fix an initial price for water as for gas—so much per thousand or million gallons, or so much per cent. on the rateable value. He, however, disclaimed any idea of suggesting that this should be done. There was not a complete analogy between gas and water. With the former, a good deal of the success depended on the cost of manufacturing the gas and the economy that might be effected; while no such question arose with regard to water. Economies were possible in pumping, distributing, keeping mains in repair, &c., in regard to water; and an inducement would be given to the Companies to effect these economies, if the prospect of a larger dividend were held out to them. But the arguments for the sliding-scale in the case of the Water Companies was not nearly so strong as in that of the Gas Companies. The whole conditions of the supply of gas were very different from when the sliding-scale was fixed. The increase in the value of residuals, and the competition of electric light and cheap oil, had introduced elements into the situation which materially affected the question as between the consumers and the Companies. Passing to the sinking fund clauses, witness said there had been a large increase of debenture capital in proportion to share capital of recent years; and if this went on, it would operate adversely to the clauses, because unless the new debentures were very remunerative, the average interest on the whole capital would be lowered, and with it the contributions to the sinking fund would be diminished. The total capital to which the sinking fund clauses applied (including the Staines reservoirs capital), was £6,320,000. The instalment payable in 1897 he estimated at £4804; and in 1915 at nearly £120,000—that was taking the interest at 3 per cent. These instalments were paid to the City Chamberlain.

Mr. GOLDNEY remarked that one of the difficulties they had to contend with was in regard to the interest. The instalments of each Company had to be invested in that Company, and it was difficult to do this, and get the 3 per cent.

Witness (continuing) said if, as had been suggested, there was to be a very large expenditure soon on works, and those works were not very remunerative, the dividends would average less, and the contributions to the sinking fund would be less. He had assumed in his calculations that the present dividends would be maintained. It would be very speculative to go into the question of how far the expenditure which was said to be inevitable would be remunerative. The late Mr. E. J. Smith years ago produced a scheme for the purchase of the water undertakings and their transfer to a public trust. Witness criticized this scheme in detail, and came to the following conclusions: (1) That Mr. Smith's estimates of the growth of the Companies' net incomes were far in excess of the actual income earned; such excess to June, 1893, being upwards of £2,000,000. (2) That the annuities payable to the Companies during the period from 1880 to 1896-7 would have largely exceeded the actual net income earned by the Companies, and that the shareholders would have benefited by a sum of upwards of £1,900,000. (3) That the ratepayers during the same period would have had to provide a deficiency of upwards of £2,000,000; the deficiency in 1896-7 being equal to a rate of nearly 2d. in the pound. (4) That the financial advantages to be gained by the use of municipal credit to effect the transfer would not have accrue l to the public, but to the Companies. (5) That even on Mr. Smith's over-estimated figures of income (existing and prospective), the estimated loss to the ratepayers of upwards of £2,000,000 during the period might have been prevented if the incomes of the Companies, instead of being converted into permanent Metropolitan annuities, had been capitalized on the 4 per cent. table, and the purchase-money paid in cash. The paying for the concerns in annuities was bad. Mr. Smith reckoned that they were a 3½ per cent. security; but on the analogy of the Metropolitan consolidated stock, being irredeemable and secured on the rates *plus* the undertakings, they were a 3¼ per cent. security. At that time the Water Companies' stock was virtually on a 4 per cent. basis. It seemed, therefore, that the difference between 3¼ and 4 per cent., which a public authority might have saved, was lost and given to the Companies. The way in which to pay—the price having been arrived at—would be for the public authority to raise the sum required by the issue of stock secured on the rates of the area, and to hand the cash, not the stock, to the shareholders. It would be very unwise to pay in annuities secured on the rates, because that would be substituting the security of the rates for that of the Water Companies, and the former was much more valuable than the latter. If the purchasing public authority took over the debenture liabilities, they would substitute their own security for that of the Companies, which would immensely improve the value of the stocks, and virtually give a bonus to the holders. The nominal amount of debenture and loan preference stock of the Companies, at the end of 1896, was £5,818,827; and its Stock Exchange value then he put at £8,732,204. If the interest on it were to be guaranteed by the rates, its value would increase to £9,515,950—a difference of £783,746. To avoid giving such an increase to the holders, he suggested that if the purchasing authority were compelled—as was common in provincial cases of transfer—to take over this debenture stock, they should have power of redemption at a certain price within a limited period. Even then the holders would reap some benefit. One effect of the transfer would be to equalize as well as improve the value of the stocks, though obviously all the debenture stocks were not of the same value now. He had put the preference stock with the debentures; but they were not, he thought, entitled to the same consideration. Perhaps if they were paid off at the market price at the time of transfer it would be sufficient. Witness handed in a table showing that, at Dec. 31, 1896, the nominal amount of shares in the Water Companies on the market was £10,228,507; and of debentures, preference shares, and loans, £5,818,827—a total of £16,047,334. The value, at Stock Exchange prices, excluding accrued interest and dividends, was £30,883,135 and £8,732,214 respectively—or a total of £39,615,349. These figures included King's and Adventurers' shares, taken according to the average prices realized in 1896. The average interest on all the stock was 2·95 per cent.

Witness was still under examination, when the Court adjourned till yesterday (Monday).

The ninth sitting of the Commission was held yesterday—Viscount Llandaff presiding, and all the members being present. Mr. H. E. Haward, the Comptroller of the London County Council, in further examination by the Chairman, said the method of purchasing by permanent Metropolitan annuities was a bad one. The Council should have the power to purchase for cash; or, if an arrangement could be come to with the Council, supposing they were the purchasing authority, the purchase-money might be paid by stock or annuities. In the case of the purchase of the Metropolitan toll bridges, the price was arrived at, and paid as a capital sum to the Companies concerned. There were several objections to paying the money by terminable annuities, one being that it would stereotype the rate of interest for the whole period; whereas if it were raised by the issue of stock, optional power of redemption after a certain period could be taken, and so advantage in any change in the rate of interest would accrue to the Council.

THE EPIDEMIC OF TYPHOID FEVER AT MAIDSTONE.

Local Government Board Inquiry.

The inquiry instituted by the Local Government Board, at the request of the Maidstone District Council, into the recent outbreak of typhoid fever in the town, was opened on Monday last week, at the Session. House, Maidstone, before Mr. J. S. Davy, Mr. G. W. Willcocks, and Drs Theodore Thomson. The Council were represented by Mr. J. F. Parker (Messrs. Sharpe, Parker, and Co.) and Mr. Lancelot Monckton, the Deputy Town Clerk; and the Rural District Council, by Mr. Talbot, Mr. Dickens, Q.C., and Mr. Hohler appeared for the Maidstone Water Company. There was a large attendance of the general public.

At the opening of the proceedings, Mr. Parker explained that he attended on behalf of the Maidstone Authorities because under the Public Health Act they had no power to engage Counsel without the consent of the Local Government Board, who had declined to sanction the expenditure. He then proceeded to call evidence.

The first witness was Mr. Percy Adams, who stated that he acted as Deputy Medical Officer of Health, without salary, during the absence of his father, the Medical Officer, and was so acting in August and September last, when the outbreak of enteric fever occurred. On Sept. 12 six cases had been notified; and by the 16th the number had increased to 38. He first suspected the milk; but the distribution of the cases exonerated it. He then turned his attention to the water supply; and on the 18th of September he called upon the Water Company, from whom he received every assistance. The cases notified up to that time were absolutely coincident with the Farleigh water supply, which he therefore strongly suspected. On the 19th he visited the sources of the water supply with the Manager of the Company (Mr. W. J. Ware), and saw signs of recent encampment of hop pickers on the ground, and quantities of human excrement. He learned that diarrhœa had been very prevalent in the cottages near the spot, and that a child had died in the hopper houses with symptoms suggestive of enteric fever. He took samples of water for chemical analysis, and reported the result of his inquiries. On the following day he heard from the Company that the Tutsham water had been cut off. The epidemic was then at its height. The chief incidence was felt from Sept. 19 to 27, after which it declined. On Sept. 22 he again visited Tutsham with Dr. Washbourn, of Guy's Hospital, and took further samples of water for analysis. On the 27th of September Dr. Theodore

Thomson arrived from the Local Government Board, and witness accompanied him in his investigation. In his (witness's) opinion the general cause of the outbreak was undoubtedly the Farleigh section of the Company's water.

Replying to questions by Mr. Talbot, witness said he had examined the filter-beds of the Company, which were composed of two beds of sand and gravel. They were in order, but were not habitually used, and had not been in operation for some time previous to the outbreak. If properly constructed and in order, filter-beds would be an efficient protection against fæcal pollution. In cross-examination by Mr. Dickens, witness said the whole of the Farleigh supply was cut off on the 29th of September, on the evening of which day there was an area jointly supplied with Farleigh and Cossington water. There were also areas supplied by Cossington and by Boarley water alone. The portion of the town served with Farleigh water was on the highest level; then came the Boarley zone; while the Cossington zone was the lowest. In the Farleigh area there were many houses provided with privies and water-closets without water, and where the drains were only flushed by hand. There might be 4000 unflushed house drains in Maidstone; and those in the Farleigh area, being on higher ground, would be more exposed to sewer gas rising if it were not for the trapping. As a rule, the house drains were trapped. The number of typhoid cases which had occurred subsequently to Oct. 10, and therefore after the Tutsham water had ceased to operate, up to the present time was 357. Some had occurred in the Boarley and Cossington areas; and a few were still occurring from time to time. Replying to Mr. J. Brennan, who was in attendance on behalf of the Maidstone Ratepayers' Association, witness said he did not think the drainage could possibly have caused the epidemic; but it might have been an important factor in the secondary cases, which he partly attributed to want of care in home nursing and neglect of precautions.

Mr. M. A. Adams, the Medical Officer of Health, was the next witness. He expressed the opinion that specific pollution of the Farleigh water was the cause of the epidemic. On the 25th of September he recommended cutting off the whole of the Farleigh water. This recommendation was repeated on the 29th, and supported by Dr. Washbourn. After the middle of October he considered that the cases occurring were due to secondary infection. He did not regard the ventilation of sewers, and street smells arising from them, as an important factor. This closed the first day's proceedings.

Continuing his evidence on the following morning, Mr. Adams said he had repeatedly drawn attention in his annual reports to the insanitary conditions of house drainage in Maidstone, but without any effect on the large owners of house property. No complaints had been made against the Sanitary Authority. His reports had been sent to the Local Government Board as a regular part of his duty; but no representations had been made by the Board to the District Council.

Here a difficulty arose with regard to the joint report on the water by Mr. Adams and Dr. Washbourn, presented on Oct. 27 (see *ante*, p. 87). Mr. Parker explained that the Council considered themselves precluded from calling Dr. Washbourn by the refusal of the Board to grant preliminary sanction for the payment out of the rates of any expenses incurred for expert evidence. Mr. Davy said the inquiry was not being held to assist the Council in bringing an action against the Water Company, but in the public interest, for the purpose of ascertaining the facts. He considered the attendance of Dr. Washbourn was very desirable; and he would take the personal responsibility of any costs that might be incurred. It was subsequently arranged that Dr. Washbourn should be called. Mr. Parker, referring to the report in question, pointed out that it condemned the spring at Tutsham on account of the excessive number of bacteria present. The same report stated that the chief obstacle to the rapid suppression of the outbreak was the prevalence of hand-flushed closets in the town.

Mr. Adams then proceeded with his evidence. He put in a table showing the incidence of typhoid fever in the three areas of the town supplied by the Cossington, Boarley, and Farleigh waters respectively. Out of 1681 cases which had been fully inquired into, there were in the Cossington area 29; in the Boarley area, 69; and in the Farleigh area, 1583. The percentage of persons attacked was: Cossington, 0·86; Boarley, 0·97; Farleigh, 8·08. Moreover, the incidence in the Farleigh area was remarkably regular; in the other two areas, irregular. He drew the inference that a general cause was operative in the first case, and an accidental one in the second; in other words, in the Farleigh area people were attacked through habitually drinking polluted water, in the other areas through casually drinking it. He next put in two diagrams giving the dates of notification and of attack throughout the period of the epidemic. They showed that the great mass of the disease occurred before the influence of the Tutsham springs was removed. A marked fall occurred 14 days after that water was excluded, and a further fall 14 days after the whole of the Farleigh supply had been cut off. He also submitted a very elaborate diagram showing the rainfall and the level of the subsoil water for every day in the year. A comparison of these observations with the incidence of the epidemic revealed a remarkable correspondence between the outbreak and the movement of the subsoil water; and witness explained the reason of this. He said he had taken these observations for a great many years, and the condition of the subsoil water last summer was quite unprecedented. He was satisfied that the cause of the epidemic was pollution of the Farleigh branch of the Company's water supply with the specific organism of typhoid. With regard to any particular source, the evidence bore heavily against that at Tutsham; but other sources might be involved. He did not attribute the outbreak in any way to the drainage of the town, though this might be responsible for secondary cases. At this point the final report presented by Mr. Adams and Dr. Washbourn was put in, and portions of it read.

In answer to questions by Mr. Dickens, witness stated that up to the year 1890 he had analyzed the water once a month; but in that year, for economical reasons, the analysis was made quarterly. He thought this a mistake; and he gave his views on the matter in his annual report for 1890. The Boarley supply was added in 1885, in consequence of a scarcity through drought in 1884; and it turned out to be a very good water. The Farleigh supply, which was older, varied a good deal in composition at that time; and in his report for 1887 he suggested that the Company should discriminate between the good and the doubtful. It was much improved in the following years; and in 1891 it rivalled the conduit water, which he regarded as the standard of purity. His last analysis in 1897, previous to the outbreak, was made on June 29, when he found all the waters satisfactory. The condition of the soil, which he had described as accounting for the outbreak, could not have been foreseen at the time. With respect to the sanitary state of the town, he regarded the unflushed house drains as dangerous to the public health. He had drawn attention to them repeatedly; and in his report of 1892 he estimated their number at about 4000. The owners of the houses were alone responsible. The remedy for the evil was the provision of proper mechanical means of flushing; and these should be insisted on by the Sanitary Authority. With hand-flushed drains, traps were practically useless. These were precisely the conditions likely to fix the disorder upon them. Mr. Dickens thereupon asked witness whether, putting the water aside, supposing he had found the analyses all right, the state of the drains might not have been the cause of the outbreak; and witness replied: "Certainly not." He added that typhoid fever might be disseminated by means of unflushed closets, but only slowly and locally. He did not pin himself down to the Tutsham water as the cause of the epidemic.

Continuing his evidence on Wednesday, Mr. Adams stated that proper filter-beds would have modified the danger arising from the conditions he had previously described, but they must be on an adequate scale. More frequent analysis of the water was undoubtedly necessary. Witness described the geological formation in which the various Farleigh springs arose, and stated that these all came from the Hythe beds of the lower greensand, locally known as "ragstone." He had not made any personal examination of the springs in the past, as this could not be done without the assistance of the Water Company; there being nothing to be seen on the surface of the land. He had no right of access, and did not consider it part of his duty as Medical Officer of Health to inspect the ground belonging to a private Company. The Sanitary Committee had, from motives of economy, directed him to make an analysis quarterly instead of monthly after the year 1890. At the close of Mr. Adams's evidence, Mr. Davy thanked him for the care and pains he had bestowed upon it, which had been of much assistance to the Inspectors. Mr. Dickens also expressed his appreciation of witness's fairness and industry. He said he considered Mr. Adams had done great service to the town.

The next witness was Dr. Washbourn. He explained the circumstances under which his services had been sought, and stated that his preliminary report on his bacteriological examination of the water indicated dangerous pollution of the Tutsham-in-Field source. The complete report which he presented in December stated that the large number of coli bacteria found constituted definite proof of contamination with animal excreta. There was no such proof in any other of the waters examined. He regarded the Tutsham-in-Field spring as the most dangerous. In reply to Mr. Dickens, witness stated that the subject of typhoid fever was very debatable and imperfectly understood. All he had proved was pollution of the water by animal excreta. The *coli bacillus* might be derived from animals as well as from man; and the two could not be distinguished. Moreover, there were other bacilli which very closely resembled the *coli bacillus;* and he found several varieties of the latter in the samples of water he examined. In answer to Mr. Parker, Dr. Washbourn stated that he did not attach any importance to his failure to find the typhoid bacillus.

Dr. Sims Woodhead followed. He was called in by the Water Company on the 11th of October; and he advised the sterilization of the town reservoir and the mains of the Farleigh area with a solution of lime. He did this merely as a measure of precaution. He also visited all the sources of supply, and took samples on Oct. 29 from the mains and on Nov. 5 from the springs. The water from Tutsham-in-Orchard showed a comparatively small number of colonies—about 17 per cubic centimetre—and they consisted exclusively of harmless water organisms, while that from Tutsham-in-Field showed 1750 organisms per cubic centimetre; but he found no typhoid and no *coli bacilli*. A further sample from the same spring taken on Dec. 11 showed 950 organisms, but no typhoid and no *coli*. The conclusion he drew was that the large number of organisms indicated surface contamination; but the absence of *coli bacilli* showed absence of sewage contamination, whether of human or animal origin. He said he agreed generally with Dr. Washbourn's evidence, but not with respect to the classification of the *coli bacilli*. The subject had got into confusion, and organisms were now included under that heading which, in his opinion, ought not to be placed there. He would strictly limit it to those answering to certain tests which Dr. Washbourn had not applied; and therefore he thought they had not sufficient evidence before them to determine definitely that contamination had taken place. At the same time, he should not call the Tutsham-in-Field water a pure and wholesome one; nor was he in a position to deny Mr. Adams's statement that the outbreak was due to the Farleigh water. There was not, however, sufficient evidence to decide the cause for certain; and he had not made up his own mind on the matter.

The Borough Surveyor (Mr. T. F. Bunting) was then called. He said he did not attribute the spread of the fever to the sewers, because it would then have been more evenly distributed. The sewers were most defective in the area where there was the least fever.

On the resumption of the inquiry on Thursday, Mr. S. L. Monckton, the Deputy Town Clerk, gave evidence on the administrative work done by the town in connection with the epidemic. He said that no communication had ever been received from the Local Government Board with reference to complaints as to sewers or drains, nor had any order been made by the Board investing the Sanitary Authority with any of the powers or duties of the Public Health (Water) Act of 1878. Mr. Hohler put in the following resolution, passed by the Water Company on Oct. 11—"That Dr. Sims Woodhead be requested to make a thorough inquiry into the outbreak of typhoid fever at Maidstone, and to advise the Company (1) what further steps, if any, should be taken to prevent its increase; (2) as to the cause of the outbreak." In answer to Mr. Davy, he said he put in the resolution to show that Dr. Woodhead was engaged to make a thorough inquiry, not to serve a particular object.

Further medical evidence was then given by Dr. J. Tew, the Medical Officer of Health for the West Kent combined sanitary districts, which include the rural district of Maidstone. There were 45 notifications of typhoid fever in the district, of which 22 were in Barming, 12 in East Farleigh, and the rest in other villages. There were other cases in the workhouse. Part of the district was within the area of the Company's Farleigh supply—viz., portions of East Farleigh, West Farleigh, and Barming. All the cases in these parishes, except six, occurred in houses

supplied with Farleigh water. In two of the exceptions the patients had their midday meals in a house supplied with that water, which they drank. On Sept. 22 he took two samples of water from taps—one in East Farleigh, and the other in Barming. Bacteriological examination carried out by himself showed the presence of the typical *coli bacillus* in both samples; but no typhoid *bacillus* was found. He drew the conclusion that the water had been contaminated with alvine excreta. Examination by Mr. Foullerton, of the Institute of Preventive Medicine, gave the same result.

Mr. S. Stallard, the Inspector of Nuisances to the Rural District Council, confirmed Dr. Tew's evidence, and put in the bye-laws relating to hop-pickers. They did not contain any clause requiring the provision of privy accommodation; and witness stated that when privies were provided they were quite useless, and were a greater nuisance than if there were none. Dr. Tew, recalled, agreed to a great extent with the last witness. He said privies were improperly used, and became a nuisance. It would be very difficult to enforce the proper usage of them. A trench, as dug for soldiers, would be much better; and such a trench was, he believed, in use in some places. Mr. Fletcher, the Chairman of the Rural Sanitary Authority, and a large hop grower in the district, considered the bye-laws were better without provisions for privy accommodation. On the other hand, Mr. W. Morting, a town councillor, who visited Tutsham early in October and found the ground polluted, said he thought if such accommodation had been provided the epidemic might never have occurred. Dr. Oliver, who was Mayor of Maidstone at the time of the outbreak, explained what led the Local Authority to fix the responsibility on the water supply. There was, first, the sudden character of the outbreak, suggestive of water-borne infection; then the pollution of the ground at Tutsham; and, thirdly, the incidence of the disease in the areas supplied with Farleigh water. These considerations taken together, and supported by the results of analyses, convinced the Town Council that the water was the cause.

It was arranged that the Inspectors should visit the springs on Friday, and resume the inquiry on Tuesday (to-day), when Mr. Ware, the Manager of the Water Company, will give evidence.

The Rochdale Corporation and the Todmorden Water-Works.—At the monthly meeting of the Rochdale Town Council last Thursday, the Water Committee gave an account of their negotiations with the Todmorden Corporation on the water-works question. The Corporation had asked the Committee to withdraw from their Bill for the purchase of the Todmorden Water Company's reservoir all works and powers within the Howroyd and Gorpley Valley, as well as for a compulsory supply of water for ten years, and provision for the acquisition of the works in the meantime, if they thought fit, upon certain terms. The Committee answered that they could not comply with the first request; and with regard to the second, they suggested a period of five years. They added that they would require £44,200 for the mains, the monopoly of supply, &c. The Corporation replied that these were impossible terms; but it was arranged that the Committees of the two Corporations should hold a joint meeting on the question.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The plans for the new gas-works at Perth show buildings spread over an area of about five acres, with railway accommodation all around them. The retort-house stands gable-on to the wall farthest from the gateway, with the purifier-house on one side of it, and vacant ground on the other. The retort-house will be 194 feet long by 67 feet broad, and will have coal-stores on either side, each 31 feet broad, capable of containing 8000 tons, which is equal to about ten weeks' supply in winter. West's stoking and conveying machinery will be fitted up. The purifier floor will be elevated. There will be six boxes, each 30 ft. by 20 ft. situated in an open building 180 ft. by 40 ft. The exhausters from the present works will be used; but nearly all the other plant will be new. There is to be a sulphate plant, provided by Messrs. R. & J. Dempster, Limited, of Newton Heath. Workmen have almost completed the levelling of the ground—a rather extensive operation—and so building may be begun almost at once. The buildings are to be of brick. The total cost is estimated at about £50,000. On Monday night, the Works Committee of the Gas Commission met and considered the tenders for various parts of the works. It was found that they exceeded the estimate of Mr. A. Wilson, the Engineer and Manager; and the Committee sent the offers back to a Sub-Committee, with instructions to endeavour to bring them within Mr. Wilson's estimates.

Mr. J. M'Gilchrist, of Dumbarton, has sent out, as arranged at the meeting of the North-British Association at Ayr, the remaining copies of the life of William Murdoch, entitled "Light Without a Wick." Among the recipients are the various public libraries in the United Kingdom. This, I presume, will be about the last step in connection with the movement for the provision of a memorial to the inventor of gas lighting.

On Thursday, Sheriff Campbell Smith, of Dundee, held a public inquiry at Broughty Ferry regarding an application by the Police Commissioners for a Provisional Order empowering them to borrow money for the extension of the gas-works, and to do away with a provision of an old statute requiring owners of property to repair the footpaths. Mr. Edward Cowan, the Town Clerk, stated that the application was for the purpose of effecting increased borrowing powers from £14,000 to £29,000, and the alteration of the local Act regarding the foot pavements. It was asked that a Provisional Order be granted the Commissioners to make such alterations in the "Broughty Ferry Commissioners' Gas Act, 1870," and the "Broughty Ferry Paving Act, 1883," in terms of the draft Order which had been annexed to the petition. The Commissioners of the burgh took over the gas-works from the old Gas Company; and they had paid certain sums of money which were represented by annuities. Power was given in 1880 to borrow a sum of £8000, which brought the total up to £14,000. Their borrowing powers were now exhausted; and they had no money to defray the cost of extending and enlarging the works, to meet the demand for gas and to continue the effective lighting of the burgh. Great difficulty was experienced at the latter end of the year in meeting the requirements of the inhabitants. Mr. Baxter Gray, who was the first witness, stated that he was Finance Convener, and had been thirteen years a commissioner of the burgh.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST

Referred to on p. 276.

Issue.	Share.	When ex-Dividend.	Dividend or Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 14	10½	Alliance & Dublin 10 p. c.	25—26	+1	4 0 9
100,000	10	„	7½	Do. 7 p. c.	16½—17½	..	4 5 8
300,000	100	Jan. 3	5	Australian 5 p. c. Db.	105—107	..	4 13 6
200,000	5	Nov. 11	6½	Bombay, Ltd.	6⅜—7⅛	..	4 9 7
40,000	5	„	6⅝	Do. New, £4 paid	5—5⅝	..	4 14 6
380,000	Stk.	Aug. 27	12	Brentford Consolidated	300—305	..	3 18 8
240,000	„	„	9	Do. New	227—232	..	3 17 7
50,000	„	„	5	Do. 5 p. c. Prf.	145—150	..	3 6 8
159,375	„	Dec. 15	4	Do. 4 p. c. Db. Stk.	134—138	..	2 18 0
220,000	Stk.	Sep. 15	11½	Brighton & Hove Orig.	275—280	..	4 2 3
208,820	„	„	8½	Do. A. Ord. Stk.	200—205	..	4 2 11
933,500	Stk.	Aug. 27	5	Bristol, 5 p. c. max.	130—135	..	3 14 1
420,000	20	Sep. 30	11½	British	56½—57½	..	3 18 3
50,000	10	Aug. 27	11½	Bromley, Ord. 10 p. c.	25—27	..	4 5 2
71,000	10	„	8½	Do. 7 p. c.	20—22	..	3 17 3
500,000	10	Oct. 14	6	Buenos Ayres (New) Ltd	9⅜—10½	..	5 17 1
98,122	Stk.	Dec. 30	4	Do. 4 p. c. Db. Stk.	97—99	+1	4 0 10
150,000	20	July 15	8½	Cagliari, Ltd.	30—32	..	5 3 1
100,000	10	Sep. 30	8	Cape Town & Dis., Ltd.	17—18	..	4 8 11
50,000	50	Nov. 2	6	Do. 6 p. c. 1st Mort.	59—61	..	4 18 5
550,000	Stk.	Oct 14	13½	Commercial Old Stock	340—345	..	3 18 3
200,750	„	„	10½	Do. New do.	255—260	..	4 0 9
200,750	„	Dec. 15	4½	Do. 4½ p. c. Lb. dc.	154—157	..	2 17 4
800,000	Stk.	Dec. 15	12	Continental Union, Ltd.	250—255	..	4 14 1
200,000	„	„	9	Do. 7 p. c. Prf.	214—219	..	4 2 2
51,600	Stk	Aug. 27	14	Croydon A 10 p. c.	315—320	..	4 7 6
163,400	„	„	11	Do. B 7 p. c.	252—257	..	4 5 7
535,000	Stk.	Aug. 12	5¼	Crystal Palace Ord. 5 p c.	137—140	..	3 15 0
60,000	„	„	5	Do. 5 p. c. Prf.	140—143	..	3 9 11
486,090	10	Jan. 27	11	European, Ltd.	25½—26½*	..	4 3 0
354,060	10	„	11	Do. £7 10s. paid	18—19*	..	4 6 0
5,923,110	Stk.	Aug. 12	12¾	Gaslight & Coke, A, Ord.	306—310	−7½	4 2 3
100,000	„	„	4	Do. B, 4 p. c. max.	113—118	..	3 7 10
665,000	„	„	10	Do. C, D, E, 10 p. c. Prf.	320—325	..	3 1 6
30,000	„	„	5	Do. F, 5 p. c. Prf.	150—155	..	3 4 6
60,000	„	„	7½	Do. G, 7½ p. c. do.	222—227	..	3 6 1
1,300,000	„	„	7	Do. H, 7 p. c. max.	204—209	..	3 7 0
463,000	„	„	10	Do. J, 10 p. c. Prf.	319—324	..	3 1 8
476,000	„	„	6	Do. K, 6 p. c. Prf.	187—192	..	3 2 6
1,061,150	„	Dec. 15	4	Do. 4 p. c. Db. Stk.	138—141	..	2 16 9
294,850	„	„	4½	Do. 4½ p. c. do.	156—159	..	2 6 7
958,000	„	„	6	Do. 6 p. c. do.	205—210	..	2 17 1
70,000	10	Oct. 28	8	Hongkong & China, Ltd.	14—15	..	5 6 8
3,800,000	Stk.	Nov. 11	10	Imperial Continental	219—224	+2	4 9 3
376,400	100	Feb. 1	4	Do. 4 p. c. Dbs. Red.	98—101*	−1	3 19 3
473,600	Stk.	Aug. 12	3½	Do. 3½ p. c. Db. Stk.	104—107	..	3 5 5
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
75,000	5	Dec. 15	6	Malta & Medn., Ltd.	5½—6	..	5 0 0
560,000	100	Oct. 1	5	Met. of Melbourne 5 p. c. Db.	112—114	..	4 7 8
250,000	100	„	4½	Do. 4½ p. c. Db.	109—111	..	4 1 1
541,920	20	Nov. 11	5	Monte Video, Ltd.	15—16	..	6 5 0
150,000	5	Nov. 26	8	Oriental, Ltd.	8¼—8½	..	4 11 5
135,000	5	„	8	Do. New, £4 10s. pd.	7—7½	..	4 16 0
15,000	5	„	8	Do. do. 1879, £1 pd.	1½—2	..	4 0 0
60,000	5	Sep. 30	7	Ottoman, Ltd.	4½—5½	+½	6 19 4
420,000	100	Nov. 2	6	People's Gas 1st M. Bd.	104—109	..	5 10 1
500,000	100	Dec. 1	6	of Chicago 2nd do.	103—108	..	5 11 1
250,000	10	Sep. 30	10	San Paulo, Ltd.	16—17	..	5 17 3
135,000	Stk.	—	10	Sheffield A.	250—253	..	3 19 0
209,053	„	—	10	Do. B.	250—253	..	3 19 0
447,427	„	—	10	Do. C.	250—253	..	3 19 0
5,475,000	Stk.	Aug. 12	5¼	South Metrop., 4 p.c Ord	145—148	..	3 10 1
1,416,667	„	Jan. 13	3	Do. 3 p. c. Db. Stk.	105—108*	..	2 15 7
60,000	Stk.	Sep. 15	12	Tottenham and A.	285—295	..	4 1 4
60,000	„	„	9	Edmonton B.	205—215	..	4 3 9
182,380	10	Dec. 20	7	Tuscan, Ltd.	13¾—14½	..	4 16 7
149,900	10	Jan. 3	5	Do. 5 p. c. Dbs. Red.	100—103	..	4 17 1
				WATER COMPANIES.			
746,164	Stk.	Dec. 30	10½	Chelsea, Ord.	335—340	..	3 1 9
150,000	„	„	5	Do. 5 p. c. Prf.	177—180	..	2 15 6
160,000	„	„	4½	Do. 4½ p.c. Pf. Stk., 1875	157—160	..	2 16 3
175,785	„	Sep. 30	4½	Do. 4½ p. c. Db. Stk.	160—165	..	2 14 6
1,720,560	Stk.	Oct. 14	7½	East London, Ord.	233—237	..	3 3 3
654,740	„	Dec. 30	4½	Do. 4½ p. c. Db. Stk.	162—165	..	2 14 6
390,000	„	„	3	Do. 3 p. c. Db. Stk.	105—107	..	2 16 1
700,000	50	Dec. 15	7½	G'd Junct'n, 10 p. c. max.	122—127	..	2 19 0
295,000	Stk.	„	4	Do. 4 p. c. Db. Stk.	147—152	..	2 12 8
708,000	Stk.	Aug. 12	13	Kent	362—367	..	3 10 10
160,000	„	„	7	Do. New, 7 p. c. max.	215—220	..	3 3 7
1,043,800	100	Dec. 30	10	Lambeth, 10 p. c. max.	307—312	..	3 4 1
406,200	100	„	7½	Do. 7½ p. c. max.	227—232	..	3 4 8
350,000	Stk.	Sep. 30	4	Do. 4 p. c. Db. Stk.	147—150	..	2 13 4
500,000	100	Aug. 12	13	New River, New Shares	452—457	..	2 16 10
1,000,000	Stk.	Jan. 27	4	Do. 4 p. c. Db. Stk.	151—154	..	2 11 11
902,300	Stk.	Dec. 15	6	Southw'k & V'xhall, Ord.	166—169	+1	3 11 0
126,500	100	„	6	Do. do. 7½ p. c. max.	160—165	+3	4 10 11
489,200	Stk.	„	5	Do. do. 5 p. c. Prf.	175—180	..	2 15 6
1,019,585	„	Oct. 14	4	Do. 4 p. c. A Db. Stk.	147—150	+1	2 13 4
1,155,066	Stk.	Dec. 15	10	West Middlesex	317—322	..	3 2 1
200,000	„	„	4½	Do. 4½ p. c. Db. Stk.	163—166	+1	2 14 3
					* Ex div.		

Since 1870, the Commissioners had managed the gas-works; and these had been extended when found necessary. In that time the burgh had grown considerably. The rental in 1870 was £25,343, and it had increased to £38,843 in 1882. At the present time, it was £52,740. As to the gas-works, there were three holders capable of storing 150,000 cubic feet of gas; while the maximum day's make had been as much as 200,000 cubic feet. The Commissioners had had the matter before them some time ago; and it was then considered a rather grave question to face. They, however, in May last year asked Mr. J. Hepworth to examine the works and report. Mr. Hepworth, in his report, referred to the storage accommodation; and advised the Commissioners to apply at the earliest opportunity for an extension of their borrowing powers. The consumption of gas in 1882 was 19 million cubic feet; in 1896 it had risen to 34½ millions; and it was now 37 millions. Mr. A. Waddell, the Gas Manager, said he had been four years at the works; and from his experience during the winter months there was need for extensions. The recommendations of Mr. Hepworth, if carried out, would, he thought, involve a capital expenditure of £7000. There were no objections to the proposals of the Commissioners; and the Sheriff reported favourably upon them to the Secretary for Scotland.

The "Dundee Courier" to-day says: "The introduction of the prepayment meters into small houses in Dundee, where no gas was being used, has been attended by very gratifying results. Since the Commissioners commenced to supply these in June, no fewer than 650 meters have been fitted; and still the cry is for more. But, owing to the general demand for these meters all over the country, the makers have been unable to keep up the supply. As, however, the Commissioners have now got delivery of a large lot of meters, they will be enabled to make up their leeway and attend to further orders. Along with these meters, the Commissioners supply a boiling-ring; and the two combined form an excellent and economical method of lighting and cooking in a way peculiarly adapted for small houses. A pennyworth of gas will light a room for five or six hours; and another pennyworth will effect a good deal in the way of cooking." The experience in Dundee is not singular. The Corporation Gas Committee on Tuesday sold a quantity of sulphate of ammonia at the price of £9 14s. per ton.

There is a rumour that Sir Henry Campbell-Bannerman, M.P. for the Stirling Burghs, is to be asked to arbitrate between the Stirling Gas Company and the Corporation, so as to avoid the cost of a fight before Parliamentary Committees over the Company's Bill. Sir Henry is not likely to undertake any such task, as, whichever way his decision went, it would be sure to alienate a certain number of his constituents. If the parties wish to arbitrate, there are plenty of members of Parliament, or other eminent men, who could undertake the work. But, unless there be a very strong local desire to arbitrate, there never will be any such thing. Counsel at Westminster want their fees; and arbitration would stop that. There will therefore be no arbitration. This is already apparent, for a deputation of five members of the Town Council have been in London this week coaching their Parliamentary Counsel and Agents, in view of what is before them.

The Edinburgh and Leith Gas Commissioners have exercised, for the first time, their power to sell gas in bulk to any local authority. This is the Parish Council of Currie, a country parish with a village in it, about seven miles from the city. The Council have erected 26 public lamps in the district; and they have also received applications beyond their expectation from private consumers for gas supplies.

According to a newspaper report, the community of Peebles are agitated over what is believed to be the discovery that the Gas Company have erected part of their works upon land which is the property of the burgh. A plan of the ground feued to the Company in 1855 went astray, and so the exact boundary between the gas-works site and the burgh property was not known. Now the plan has been discovered; and it is said to show that there has been an encroachment by the Company. The sensations of Christmas and the New Year having passed, the people of Peebles seem to have felt time hanging heavily on their hands; and they have consequently got up a sort of hinterland question of their own. "Peebles for pleasure," is a well-known saying. It would seem to be pretty near the truth, for the inhabitants appear to be resolved that there shall be no dull days among them. If anything were required to put the stamp of joviality upon the whole incident, it is to be found in the fact that the Directors of the Gas Company, instead of flying to their Law Agent in an endeavour to assert their rights, or even going through the solemnity of expressing regret for their conduct, have signed a document in which they agree to take down and remove the offending structures. But, wily men, they do not offer to take them down at once. This would, of course, have closed the pleasant little incident too abruptly. They are to remove them "whenever asked to do so by the Town Council;" so that the possibilities for entertainment out of the situation are not exhausted.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 5.

Sulphate of Ammonia.—The month has opened with a quieter market. But prices have been fairly well maintained; and to-day's quotations are £10 1s. 3d. to £10 3s. 9d. per ton, delivered f.o.b. at the ports. January requirements having been covered, buyers show some disposition to wait in regard to February; but a fair amount of business has nevertheless been done. Some second-hand lots have been hampering the situation—being offered under current quotations; but makers still maintain a firm attitude. There has been less doing in the forward position; the rapid advance having choked buyers off in the meantime. £10 2s. 6d. per ton, f.o.b. Leith, is required for February-June delivery; while the last sale reported for May-October delivery was at £9 17s. 6d. per ton. London makers, being well sold ahead, are still off the market for forward as well as for prompt delivery.

Nitrate of Soda remains, without special feature, at 7s. 6d. per cwt. for good, up to 7s. 7½d. per cwt. for fine, quality.

LONDON, *Feb.* 5.

Tar Products.—A somewhat better tone pervades this market. Pitch continues to be in better request at improving rates; and, while benzols have made no advance in price, there are ready buyers at the quotations

R. & A. MAIN, Ltd.

Argyle Works, GLASGOW.
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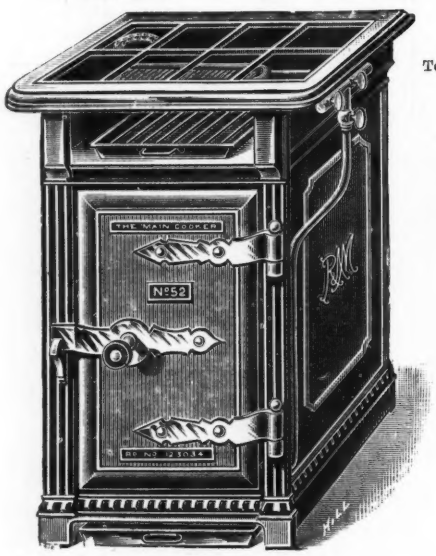
109, Farringdon Road, LONDON, E.C.
Telegrams: "GASMAIN, LONDON."

BRISTOL: 28, BATH STREET. Telegraphic Address: "GOTHIC."
BIRMINGHAM: 1, OOZELLS STREET. Telegraphic Address: "GOTHIC."
MANCHESTER: 37, BLACKFRIARS STREET. Telegraphic Address: "GOTHIC."



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No.	Clear inside Dimensions of Door Opening.			Outside Measurement.			PRICE.
	Wide.	Deep.	High.	Wide.	Deep.	High.	
	In.	In.	In.	In.	In.	In.	
48	12	12	19	17	16¼	28½	£2 5 0
52	12	12	19	17	16¼	28½	£2 10 0
54	14	12	19	19	16¼	28½	£2 17 6

Nos. 52 and 54 fitted with Packed Door and Double Top Plate.

Over **30,000** *of this Stove Purchased by London Gas Companies alone.*

named below. Considerable quantities of German coke-oven benzol and crude naphthas have been offering in this market, which has had a depressing effect. Crude naphtha from this source is said to be of considerably less value than that obtained from coal tar, owing to its being chiefly benzol, and containing only small quantities of the heavy naphthas, which are now of greater value than the benzol itself. Naphthalene is selling more readily; but prices have fallen from last year's estate. Carbolic is firm, with a good outlet. There is also a capital inquiry both for solvent and heavy naphthas. Anthracene is held for Committee's rates; but no business is reported. With the prices now prevailing, tar distillers are not having a good time, having bought their tar when products were more valuable. There does not, however, appear to be much hope for serious improvement for some time to come.

Market values for the week are: Tar, 12s. to 16s. Pitch, east coast, 18s. 6d.; west coast, 16s. Benzol, 90's, 1s. 3d.; 50's, 1s. 5½d. Toluol, 1s. 8d.; pure, 1s. 11d. Solvent naphtha, 1s. 6½d. Heavy naphtha, 1s. 3½d. Crude, 30 per cent., naphtha, 7d. to 8d. Creosote, 2½d.; liquid, 2⅜d. Heavy oils, 40s. to 50s. Carbolic acid, 60's, 2s. Naphthalene, nominal, 50s.; salts, 27s. 6d. Anthracene, "A," 5½d.; "B," 4½d.

Sulphate of Ammonia.—There has been a slackening off to some extent in this market. It looks as if buyers were having a breathing time, after the very rapid advance that sulphate has made during the past two or three months. There is no reason, however, for uneasiness; and any day may see the demand as urgent as before. Meantime, £10 2s. 6d. to £10 15s., less 3½ per cent., is the market value at all ports.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Except for a continued depression in the better qualities of round coal, the general outlook of trade is more satisfactory; and even at this late period of the season, a spell of severe weather might also bring up the house-fire coal demand to something like its average dimensions. At present, however, pits are barely disposing of their output; and stocks remain untouched. List rates are without quotable change, on the basis of 10s. 6d. to 11s. per ton at the pit for best Wigan Arley; 8s. 6d. to 9s. for Pemberton four-feet and seconds Arley; and 7s. to 7s. 6d. for common house coal. In the open market, however, surplus lots are pushed for clearance sale at special figures. Common round coals are moving off fairly well, for iron-making, steam, and general manufacturing purposes; and though supplies are plentiful owing to the restricted requirements for common house-fire coals, prices are very steady at about 6s. 6d. per ton as the minimum for good qualities of steam and forge coal. The present output of engine fuel is also moving away readily; and notwithstanding a keen competition with slack from other districts, local colliery proprietors show no weakening, and quotations are firm at 3s. to 3s. 6d. per ton for common, 3s. 9d. to 4s. 3d. for medium, and 4s. 6d. up to 5s. for the better qualities. The shipping trade continues moderately active; and good qualities of steam coal average 8s. 3d. to 8s. 6d. per ton, delivered at the Mersey ports.

Northern Coal Trade.—The demand for coal has been interfered with by the stormy weather, which has delayed many steamers. Best Northumbrian steam coals have, in consequence, fallen in price, and are now quoted at 8s. 3d. per ton f.o.b.; second qualities are 6d. per ton lower; and steam smalls, 3s. per ton. There is a better demand for manufacturing coals, now that the engineering works are fully restarted; and this demand should further increase when the shipping trade is more active, for large quantities of smithy coals are sent abroad. The gas coal trade is steady, though the demand is less than it was. The price for occasional cargoes varies from 7s. 9d. to 8s. per ton f.o.b. Further contracts are now being negotiated for Gothenburg and Stockholm; and it is probable that the price will not be far from 7s. 6d. to 7s. 7½d. per ton f.o.b. But much, of course, depends on what is allowed for the freight. Gas coke is fairly steady; more being exported to some of the neighbouring Continental countries. The price is unaltered this week.

Scotch Coal Trade.—Trade continues healthy, and prices steady. Splint is plentiful, with little alteration in price. Main is slightly higher. Ell is in good demand, at unchanged rates. The prices quoted are: Main, 6s. 6d. per ton f.o.b. Glasgow; ell, 7s. to 7s. 3d.; and splint, 7s. 3d. to 7s. 6d. The shipments for the week amounted to 152,714 tons—an increase of 3983 tons upon the previous week, and of 32,245 tons upon the corresponding week of last year. For the year to date, the total shipments have been 528,603 tons—an increase upon the same period of last year of 43,663 tons.

Periodical Analyses of Water.—The Rural District Councils of Eton and Malling have passed the following resolution: "That a representation be made to the Local Government Board with a view to regulations being issued, imposing the duty upon all public water companies to submit periodically, at their own expense, an analysis of the water supplied by them to all District Councils, Urban and Rural."

The London County Council and Low-Flash Oil.—At the meeting of the London County Council last Tuesday, it was unanimously resolved—"That, in view of the dangerous nature of low-flash petroleum oils sold in London, and the numerous fatal and other accidents that occur through the use of such oils in lamps, it be referred to the Public Control Committee to further investigate the causes of such accidents, with a view to representations being submitted to Parliament as to the desirability of raising the flash-point fixed by the Petroleum Acts."

Hastings Water Supply.—Last Friday, Mr. H. P. Boulnois, one of the Inspectors of the Local Government Board, held an inquiry, at Hastings, into the application of the Corporation for sanction to borrow £139,000 for a new water scheme. The town is at present in possession of a capital supply; but, in consequence of the extension of the borough and the rapid growth of the population, it is considered desirable to increase it. It is therefore proposed to carry out the works in the Brede valley, nine miles from Hastings, experiments justifying the belief that an abundant supply can be drawn from that district, and moreover, the water having been certified by Dr. Dupré to be excellent in quality.

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HIGHEST QUALITY
TUBES AND FITTINGS
GAS, STEAM, WATER, GALVANIZED TUBES and FITTINGS in all Sizes.
LARGE TUBES FOR COLLIERIES.
Illustrated Price Lists on Application.
LONDON OFFICES: 46, QUEEN VICTORIA STREET, E.C.

A New Water Reservoir for Barry.—A Local Government Board Inquiry was conducted last Wednesday at Barry by Mr. Herbert H. Law, respecting an application by the District Council for power to borrow £7950 required for the construction of a new high-level reservoir and other purposes. Plans of the proposed reservoir were submitted by Mr. E. W. Waite, the Water Engineer. The capacity is to be 100,000 gallons; and the cost is estimated at £3500. The Council also propose to spend nearly £4000 on new mains; £2000 for alterations to the engine-house and a new pumping-station, and £50 for a testing and stamping apparatus, &c. Other matters included in the application next received attention.

Rye Water Supply.—An application by the Rye Town Council to borrow £1500 for the purposes of water works at Cadborough formed the subject of an inquiry at the Town Hall last Thursday by Mr. H. P. Boulnois, on behalf of the Local Government Board. In stating the case for the Council, the Town Clerk (Mr. W. Dawes) said the population of the town was about 3970; the assessable value under the general district rate, £11,302; and the outstanding loans, £2115. He said the estimated cost of carrying out the works was £1200, in addition to other expenses. The Surveyor (Mr. Palmer) said the yield of water at the proposed works might be taken at something like 200,000 gallons a day; and it was proposed to pump it through a 4-inch main, used for that purpose only, to the existing reservoir. At the close of the inquiry, the Inspector visited the works.

Sanitary Authorities and Water Companies.—In view of the fact that the water supply in the Stockport district is in the hands of a Company, and the Sanitary Authority have no legal right to go upon their premises, the Corporation of that borough are inviting other authorities similarly placed to join them in taking action with a view to giving effect to the following resolution of the Water Inquiry Committee: "That, inasmuch as outside London, and except in regard to wells and pumps, sanitary authorities possess no executive powers for the protection of public water supplies in the hands of water companies, whereas the consumers of flesh, milk, and other foods are safeguarded by statute, we earnestly recommend that legislation be initiated whereby every sanitary authority supplied by a water company which is not also a sanitary authority be empowered to authorize any duly appointed official to enter, inspect, inquire, and take samples at any part of any source or works of water supply or water purification, at any time by day or night, and whereby also such water company shall be required to afford all reasonable facilities and information for such inspection, inquiry, and sampling."

Water Supply and Typhoid Fever at Camborne.—A few weeks ago an outbreak of typhoid fever occurred at Camborne; and the Sanitary Committee of the District Council appointed Dr. Bruce Low to investigate the matter. His report recently came before the Council. The first matter considered was the water supply. Dr. Low stated that he had visited the gathering-grounds of the Water Company at Cargenwyn and Boswyn, and pointed out the risk of contamination to the supply at the former place, which was being remedied; the water being piped direct from the springs into the reservoir, and all surface water being excluded. He stated, with reference to Boswyn that, in his opinion, the outbreak of typhoid was due to contamination of this supply. He showed by a diagram the connection in times of heavy rains between the Boswyn tank and a cesspool containing excrement from typhoid patients; and he proved by statistics that notifications rose and fell with the wet and dry periods of November and December last. As further proof for attributing the outbreak to the water, he explained that out of 116 cases in the Camborne district, only four lived outside the water supply, and three of these had admitted drinking the water. No discussion took place upon the report, which was regarded as preliminary.

Rugby Water Supply.—At the meeting of the Rugby Urban District Council last Thursday week, the question of the town's water supply was considered. A Committee had been asked to wait on the Local Government Board to ascertain their views before the Council took definite action; and they now reported having interviewed General Carey. They discussed with him (1) the removal of the Council's intake of water from the present spot to the mill-dam on the River Avon; (2) the formation of a large reservoir in continuation thereof; (3) the formation of a new reservoir by the side of the present one; and (4) the making of a reservoir near the water-tower on the other side of the town. It was understood that General Carey's opinion would not be binding on the Board, but he said he thought they would offer no objection in principle to any scheme in relation to the use of water from the Avon—seeing that the Council already had an Act in favour of such source, and the conditions had not seriously altered—provided the water was properly filtered. On the whole, his opinion seemed to be that the Council should acquire the mill, and see what the result was, before moving further in any scheme. The matter was referred to the Water Committee, with a view to carrying out the purchase. It is estimated that the cost of the mill and land adjoining, and constructing a reservoir, will be something like £25,000.

A Temporary Water Famine at Worksop.—The inhabitants of Worksop have been greatly inconvenienced by the sudden and unexpected stoppage of their water supply. On the 27th ult., it was first ascertained that some serious mishap had occurred in connection with the water-works; and prompt action was taken to prevent, if possible, any diminution of the supply. Unfortunately, however, the irregularity was not detected in time, with the result that on Saturday the inhabitants were apprised of the fact that no water was forthcoming. The Engineer who has been consulted in the matter (Mr. T. Thornton), states that the stoppage was caused by the concrete bottom of the reservoir falling in, with the result that the water disappeared altogether. The collapse was due to the wearing away of the sub-soil, which has drifted into and blocked the water supply, which lies underneath the sandstone bed. The water-works have been in existence upwards of twenty years; but this is the first mishap that has occurred. It is estimated that the damage done is above £1000. There has been a mysterious leakage of water for some time; and there is no doubt that the disintegration of the sub-soil has been going on for a considerable period. Towards the end of last week, a regular though limited supply of water was procurable; and the Worksop and Retford Brewery Company kindly placed their supply from an artesian well at the disposal of the public.

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

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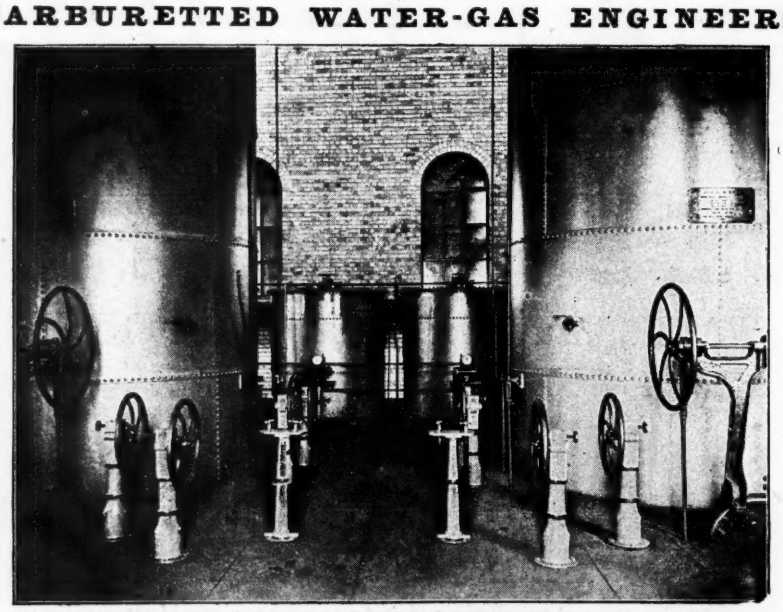
CARBURETTED WATER-GAS ENGINEERS.

THE M.-W.-P. PLANT is designed to use the Heaviest as well as the Lightest Grade of Oil.



RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One Quarter Section of Birmingham Plant, Windsor Street Station.

The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 10 MILLION CUBIC FEET.

The Godalming Town Council and the Water Supply.—The Special Committee of the Godalming Town Council have reported their unanimous wish that the Council should purchase the Frith Hill Water Company's undertaking on the terms offered in 1895; and the Council have agreed to the motion *nem. con.* The Chairman of the Company (Alderman Collier) mentioned that the Directors were quite prepared to adhere to the agreement; and the Special Committee were thereupon empowered to arrange terms.

The Water Question at Chard.—Considerable difficulty continues to be experienced at Chard respecting the improvement of the water supply. Last Thursday, the Town Council sat for nearly four hours discussing the matter with their Engineer (Mr. Hodson). The question of obtaining a supplementary supply by gravitation from Combe St. Nicholas was considered in Committee, in consequence of the opposition offered to the scheme by the Rural District Council. A report on the recent analysis of the present supply was presented by the Water Committee, who recommended the temporary diversion of a portion of the supply in order to prevent the possibility of polluted water flowing into the mains. Mr. Gillingham, who had issued a pamphlet to the burgesses—asserting that an attempt was being made to tamper with the public rights with the water—opposed the recommendation of the Committee. A heated discussion followed, in which the Mayor said he objected to Mr. Gillingham posing as the only man in the town who was looking after the public interests. In the end, the Council separated without passing any resolution.

Mr. W. H. Tickell, who has been for seven years in the Warrington office of Messrs. Richmond and Co., Limited, has been promoted to the position of cashier at the Company's new works at Stratford, the opening of which was noticed in the "JOURNAL" last week. At a farewell supper to which the General Manager at Warrington (Mr. H. E. Ransome) invited Mr. Tickell, the Secretary of the Company (Mr. L. A. Voisey, C.A.), and the seniors of the office staff, he was presented with a gold Masonic emblem ring, as a mark of their esteem.

West's Gas Improvement Company (Limited), are carrying out a considerable enlargement of their works, which, when completed, will enable them to double their present output. For this purpose the Company have taken an extra piece of land at the top end of their existing premises, and the extension they are making will include a new platers' department, and also a special section for the manufacture of retort mouthpieces. Among the new plant which has been recently put down is a hydraulic system, with furnaces heated by producer gas, for stamping mouthpiece lids, chains, levers, and general forgings. The Company have work in hand sufficient to carry them over the ensuing twelve months. They have recently completed a number of large orders for stoking-machines, several of which have been supplied with air compressors. These have been sent to works at Sheffield, St. Helens, London, Longton, Wellingborough, and Perth, while orders have been received from Copenhagen. As mentioned in a paragraph which appears in another part of the "JOURNAL," the Company were successful, during the recent engineering strike, in filling the vacancies with non-union men.

GWYNNE & BEALE'S

PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: GWYNNEGRAM, LONDON." Telephone No. 65,095, Holborn.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS;

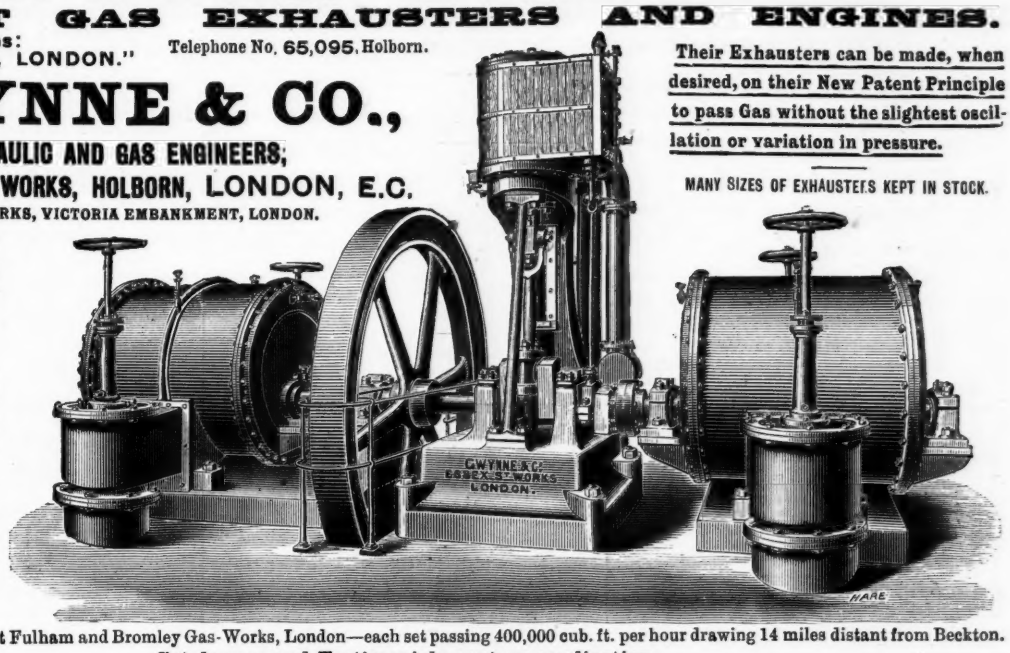
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 35,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

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Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed.

JOHN WM. O'NEILL, Managing Director,
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ANDREW STEPHENSON, AGENT. All communications re Oxide to be addressed to No. 162, Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 300 British Gas-Works.

ANDREW STEPHENSON,
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LONDON, E.C.

Telegrams: "Volcanism, London."

SULPHATE OF AMMONIA SATURATORS.

WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.
Please write for Estimate before ordering elsewhere.

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER LINCOLN."
[For Illustrated Advertisement, see Feb. 1, p. 252.]

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

LLEWELLYN JONES & T. B. YOUNGER, CONSULTING ENGINEERS, VALUERS, &c., CHESTERFIELD HOUSE, 98, GREAT TOWER STREET, E.C.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

SULPHURIC ACID for Sale. BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS CARBON Wanted, not less than 4-Ton Loads.
Apply to the BRIMINGTON CARBON COMPANY, Sowerby Bridge, YORKS.

TO GAS AND WATER OFFICIALS.

SPECIALLY favourable terms for Cycles. First-Class Workmanship and Material guaranteed. Art Catalogue post free.
MELROSE CYCLE COMPANY, COVENTRY.

CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 30, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
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AMMONIACAL LIQUOR wanted.
BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

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J. C. CHAPMAN, M.I.M.E., and Fel. Chartered Inst. Patent Agents. ADVICE ON ALL MATTERS CONNECTED WITH ABOVE. Information and Handbook on application. 70, CHANCERY LANE, LONDON, W.C.

NEW GAS PLANT CEMENT.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
For all Joints in connection with Oil Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

GAS TAR wanted.
BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

TUBES for Gas, Steam, and Water (all Sizes) Welded or Riveted. TANKS, HYDRAULIC MAINS, RETORT-LIDS, &c.
JOHN SPENCER, Globe Tube Works, WEDNESBURY; and 14, Great St. Thomas Apostle, LONDON.

HUTCHINSON BROTHERS, Gas Engineers, &c., Falcon Works, Barnsley, Makers of Wet and Dry Gas-Meters, Brass-Work, and general Gas Apparatus, Lead Saturators, Tanks, &c., Tools, and Gas-Works Sundries. (See p. 255, last week's issue.)
Telegrams: "HUTCHINSON BROS., BARNSLEY."

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. **Compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

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JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
Before placing Orders, please write for Estimate.

SPENT OXIDE wanted.
BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SADLER & CO., Ld., Middlesbrough; ULVERSTON (BARROW); PORTSMOUTH; CARLTON (N.E.R.); and STOCKTON. Tar and Petroleum Distillers. Benzol and Petroleum Spirit, 700 and other Gravities specially prepared for Carburetting. SOLAR OIL for Gas Making, Kerosene, &c.
Correspondence invited.
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OLD Retorts made equal to new by repairing them with CROWTHER'S PATENT STICKFAST FIRE CEMENT. Unequalled for Repairing Inclines. Can be used in Hot or Cold Retorts; and "A1." for Mouthpiece Joints. Satisfaction Guaranteed.
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INCREASE the efficiency of your PURIFIERS by adopting CRIPPS'S PATENT BYE-PASS VALVE in the lower Tiers of Sieves. Practical Experience proves their Economy. Engineers are repeating orders after thorough trial.
References and Particulars can be obtained from the Makers—
C. & W. WALKER, Midland Iron-Works, Donnington, near Newport, SALOP.
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SITUATION wanted by an Experienced WORKING MANAGER or FOREMAN in small Country Gas-Works. Understands every practical point; also Service Laying, Meter Taking, or Fixing. Good References.
Address No. 2996, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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SEVERAL good Men required for Gas and Electrical Work.
Apply after the 3rd of February, to Messrs. P. ORR AND SONS, Moorgate Station Chambers, LONDON, E.C.

ADVERTISER, m'ddle-aged, experienced in Gas and Municipal Accounts, good knowledge of Gas-Works Management (indoor and out), desires appointment. Excellent References. Moderate Salary.
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WORKING Manager wanted for Works, making about 8 Millions per annum. Will have to do Main and Service laying and Meter fixing. One who can set Retorts preferred. House, Coal, and Gas found. State Wages required. *Copies* only of Testimonials.
Apply, by letter, to No. 2997, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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(GAS DEPARTMENT.)

WANTED, a smart intelligent young Man as RETORT SETTER. One accustomed to Regenerative Settings. Good Wages and regular Employment to a really good Man.
Apply, by letter, to the MANAGER.

CONTINENTAL Company want to open relations with Import Firms, or fairly introduced Agents for the SALE OF BOG ORE for Gas Purification. The Materials come from own diggings, and are considered the best in the market. Very liberal Terms offered.
Only well-introduced Firms are requested to apply to BERNARD VIELER, Nymegen, HOLLAND.

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Apply, by letter only, stating Age, with Testimonials, to the Chairman, on or before the 10th of February, 1898.
GEO. H. CHAPMAN,
Secretary.
Gas-Works, Stamford.

BOGNOR GASLIGHT AND COKE COMPANY, LIMITED.

WANTED, a competent Man as Gas-FITTER, MAIN and SERVICE LAYER, and METER INSPECTOR, &c. Must be steady. Permanent Situation to a suitable Man. Wages 30s. per week.
Apply to the MANAGER, giving References, and stating earliest date disengaged.
Gas-Works, Bognor,
Feb. 5, 1898.

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(WATER-WORKS DEPARTMENT.)

WATER-FITTINGS INSPECTOR.

WANTED, a Person between the age of 25 and 35, to act as WATER-FITTINGS INSPECTOR.
Applicants must have a thorough practical knowledge of Plumbing.
Wages, 32s. per week, and Uniform.
Preference will be given to a person having a Registered Certificate from the Plumbers' Company, London.
Applications, in Candidates' own Handwriting, stating Age, with *copies* of three recent Testimonials (which will not be returned), to be sent to the undersigned, on or before the 23rd of February, endorsed "Water-Fittings Inspector."
HAMLET ROBERTS,
Engineer and Manager.

BOROUGH OF IPSWICH.
(WATER-WORKS DEPARTMENT.)

MAIN-LAYER AND TURNCOCK.

WANTED, a Person having a thorough knowledge of Pipe Laying and Jointing, and to act as Turncock.
Wages 28s. per week, and Uniform.
Applications, in Candidates' own Handwriting, stating Age and Experience, accompanied with *copies* of three recent Testimonials (which will not be returned) as to ability, &c., to be sent to the undersigned on or before the 23rd of February.
HAMLET ROBERTS,
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Jan. 31, 1898.

WANTED Carbon. State Price for 4-ton Lots, delivered at nearest Station.
Address No. 2960, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO LET, on Lease, the Gas-Works of the Burton Gas, Coal, and Coke Company, Limited. Possession on the 27th of March, 1898, or earlier by arrangement.
Apply to JAS. WILKINSON, Secretary, Burton, WESTMORELAND.
P.S.—The taker will have the refusal of the principal Coal Agency in the Town.

FOR SALE, Cheap—The under-mentioned GAS PLANT:—

	Square.	Deep.	
	Ft. in.	Ft. in.	
2 PURIFIERS,	8 0	4 6	6-in. Valves & Connections.
1 "	7 6	4 6	6 " " "
2 "	5 0	4 0	4 " " "
1 "	5 0	2 9	4 " " "

C-I. SCRUBBER, 38ft. 6in. high, 6ft. dia., 14-in. "
CONDENSER, 4 inches diameter, Vertical Pipes.
EXHAUSTER (Gwynne's) 20,000 c.f. per hour 8-in. Valves
Apply to SAML. WHILE AND SONS, 60, QUEEN VICTORIA STREET, E.C.

GAS-PUMP for Sale, horizontal, one Steam Cylinder, 18-inch bore, and two Gas Cylinders, 17½-inch bore, all 24-inch Stroke, on massive Bed-Plate, with heavy Fly-Wheels. Very strong. First-Class Make. Not much used.
Apply, by letter, to No. 2878, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Modern Sulphate of AMMONIA STILL, built by Messrs. R. & J. Dempster, Manchester, 1893, with separate Liming Compartment. Capacity, with ordinary Liquor, 5000 to 6000 lbs. of Sulphate per day.
For further Particulars, apply to the BRYMBO STEEL COMPANY, LIMITED, near WREXHAM.

PURIFIERS FOR SALE.

THE Montrose Gaslight Company have FOR SALE four PURIFIERS, each 12 ft. by 8 ft. by 3 ft. deep, with four 8-inch and two 10-inch Four-Way Valves and Connections, three Tiers of Sieves in each Purifier, and Lifting Gear complete. All in good condition. Sides of Covers almost new.
For further Particulars, apply to the Manager, THOS. D. HALL.

ALTON GAS COMPANY.

THE above Company have for Disposal a 5000 Cubic Feet per Hour ROUND STATION METER (by Braddock), with Valves and Connections. Also one 6-inch CENTRE-VALVE for four Purifiers (three on and one off). These articles can be had very cheap. They are in thorough repair.
For Particulars, address F. BARNLEY, Gas-Works, Alton, HANTS.

PURIFIERS, ETC., FOR SALE.

FOUR Purifiers, each 17 ft. by 12 ft. by 3 ft. 6 in. deep (all inside measure), with six Four-Way Valves and 14-inch Connections and Lifting Gear; also two 20,000 cubic feet per hour EXHAUSTERS. The foregoing are all in good order, and immediate delivery can be given.
Apply to
A. MACPHERSON,
Gas-Works, Kirkcaldy, Manager.
Jan. 20, 1898.

BOROUGH OF BARROW-IN-FURNESS.
(GAS AND WATER DEPARTMENT.)

TENDERS FOR GENERAL STORES.

THE Corporation are prepared to receive TENDERS for the supply of FIRE-CLAY RETORTS and BRICKS, WROUGHT-IRON TUBES and FITTINGS, BRASS COCKS, GAS-METERS, OIL and PAINT, SULPHURIC ACID, LIME, IRONMONGERY, &c., as may be required from the 1st day of April next to the 31st of March, 1899.
Sealed tenders, on Forms to be obtained at the Office of the Manager of the Gas and Water Works, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tenders for Stores," to be delivered at the Town Clerk's Office, on or before Tuesday, the 15th inst.
The lowest or any tender not necessarily accepted.
By order,
C. F. PRESTON,
Town Clerk.
Town Hall, Barrow-in-Furness,
Feb. 4, 1898.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works from the 1st day of April next to the 31st day of March, 1899, delivered into Purchaser's Tank-Waggons at the Gas-Works Siding.
Any further Information may be had on application to the Manager of the Gas-Works.
Sealed Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Tar," to be delivered at the Town Clerk's Office, on or before Tuesday, the 15th inst.
The highest or any tender not necessarily accepted.
By order,
C. F. PRESTON,
Town Clerk.
Town Hall, Barrow-in-Furness,
Feb. 4, 1898.

BOROUGH OF RICHMOND, SURREY.

WATER-WORKS AND PUBLIC BATHS.
TENDERS FOR WELSH SMOKELESS STEAM COAL.

THE Town Council for the Borough of Richmond, Surrey, invite TENDERS for the supply of about 1400 Tons of best WELSH SMOKELESS STEAM COAL, to be delivered in Barges of about 40 Tons alongside the Wharf, opposite the Water-Works, Richmond, for One Year, from March 31, 1898. The Seam and District from which the Coal is to be supplied must be stated in the Tender.
Particulars and Forms of Tender can be obtained of Mr. W. G. Peirce, Engineer, at the Water-Works. No Tender will be recognized unless it is made on the prescribed form, properly filled up in every respect; and no expenses or claim will be allowed or paid to any person, whether tendering or not.
The Security stipulated by the Public Health Act, 1875, for the due performance of the Contract will be required. The Contract and Bond will be prepared by the Town Clerk.
Sealed Tenders, endorsed "Tender for Welsh Coal," and addressed to the Chairman of the Water Supply Committee, Borough of Richmond, Surrey, must be delivered at the Town Clerk's Office, by Ten o'clock on Tuesday, the 1st day of March, 1898.
The Council do not bind themselves to accept the lowest or any Tender.
FREDK. B. SENIOR,
Town Clerk.
Town Clerk's Office, Town Hall,
Richmond, Surrey, Feb. 2, 1898.

GLASGOW CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR STATION METERS.

THE Corporation of Glasgow invite TENDERS for Two STATION METERS to be erected at their Dawsholm Gas-Works.

Plans may be seen, and Form of Tender obtained, at the Engineer's Office, 45, John Street, Glasgow.

Sealed offers, marked "Tender for Station Meters," to be addressed to the Subscriber, and lodged with him on or before Tuesday, the 22nd inst.

The Corporation do not bind themselves to accept the lowest or any Tender.

J. D. MARWICK,
Town Clerk.

City Chambers, Glasgow,
Feb. 4, 1898.

CORPORATION OF TODMORDEN.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the supply of 16 INCLINED and 28 HORIZONTAL RETORTS. Also the necessary FIRE-BRICKS, TILES, and LABOUR, required for the resetting of the above.

Full Particulars to be obtained from the Engineer, Mr. H. Hawkins.

Sealed Tenders, to be endorsed "Tender for Retorts, Fire-Bricks, &c.," to be delivered at the Town Clerk's Office, Town Hall, Todmorden, addressed to the Chairman of the Gas Committee, not later than the 14th inst.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
D. SUTCLIFFE,
Town Clerk.

CORPORATION OF TODMORDEN.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for supplying and fixing at their Gas-Works one STATION METER, capable of passing 60,000 cubic feet per hour, with all the necessary Valves, &c., complete.

Full Particulars can be obtained from the Engineer, Mr. H. Hawkins.

Sealed Tenders, to be endorsed "Tender for Station Meter," must be delivered at the Town Clerk's Office, addressed to the Chairman of the Gas Committee, not later than the 14th inst.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
D. SUTCLIFFE,
Town Clerk.

THE Corporation of Middleton invite TENDERS for the supply and erection of Two New (30 ft. by 20 ft.) PURIFIERS at their Gas-Works.

Plans, Sections, &c., may be seen, and Specifications and General Conditions obtained, on application to Mr. Timothy Duxbury, Gas Engineer, at his Office, Gas-Works, Middleton, on or after Tuesday, the 1st of February.

Sealed Tenders, on Forms supplied, must be delivered at my Office, addressed to the Chairman of the Gas and Electric Lighting Committee, and endorsed "Purifiers," not later than the 16th day of February, 1898.

The Corporation do not bind themselves to accept the lowest or any tender.

FREDERICK ENTWISTLE,
Town Clerk.

Town Hall, Middleton,
Near Manchester, Jan. 24, 1898.

UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY.

THE Directors are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Works during the ensuing Six Months from the 1st of March next.

The quantity of Tar will be about 42,500 Gallons, and will be delivered free into Contractor's Barges alongside the Works, on the Grand Junction Canal.

Tenders, endorsed, must be addressed to the Chairman, and be delivered at the Company's Offices, Uxbridge, not later than Monday Evening, the 14th of February inst.

The Directors do not bind themselves to accept the lowest or any tender.

Further Particulars may be obtained of the undersigned.

ARTHUR R. BURCH,
Engineer and Manager.

Uxbridge, Middlesex,
Feb. 7, 1898.

LIVERPOOL UNITED GASLIGHT COMPANY.

TAR.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the TAR produced at their several Works for a period of One Year from July 1, 1898.

The quantities of Tar produced per annum are estimated to be as follows; but the same cannot be guaranteed, and may be more or less:—

At the Athol Street Works, about		720,000	gallons.
" Eccles Street	"	400,000	"
" Caryl Street	"	480,000	"
" Wavertree	"	510,000	"
" Linacre	"	2,300,000	"
" Garston	"	230,000	"

The Tenders may be for the whole, or for one or more of the Works separately.

Forms of Tender and full Particulars may be obtained on application to the undersigned.

Tenders, sealed and endorsed "Tender for Tar," are to be delivered here not later than the 19th of February, 1898.

The Directors reserve to themselves the right to accept any tender in part or in whole, and do not bind themselves to accept the highest or any tender.

By order,
WILLIAM KING,
Engineer.

Gas Office, Duke Street, Liverpool,
Feb. 1, 1898.

FENTON URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply and delivery of about 280 Tons of 12-inch CAST-IRON PIPES and some IRREGULARS.

Specification and Form of Tender may be obtained from the Gas-Works.

Tenders to be addressed to the Chairman, Gas-Works, Fenton, on or before the 14th inst.

F. H. DARWIN,
Engineer and Secretary.

Gas-Works, Fenton,
Feb. 3, 1898.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

GREAT YARMOUTH WATER-WORKS COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Monday, Feb. 14, 1898, at Two o'clock, in Lots,

£2500 OF FOUR PER CENT. PERPETUAL DEBENTURE STOCK
OF THE
GREAT YARMOUTH WATER-WORKS COMPANY,

offering a thoroughly high-class Investment.

Particulars of the AUCTIONEER, as above.

By order of the Directors of the

CRAYS GAS COMPANY.

£3500 ORDINARY FIVE PER CENT. STOCK.

MR. ALFRED RICHARDS will Sell the above BY AUCTION, at the Mart, E.C., on Monday, Feb. 14, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, as above.

By order of the Directors of the

WHITCHURCH AND DISTRICT (HANTS) GAS COMPANY, LIMITED.

MR. ALFRED RICHARDS will Sell by AUCTION, at the Mart, E.C., on Monday, Feb. 14, at Two o'clock, in Lots,

150 £10 FULLY-PAID ORDINARY SHARES

in the above Undertaking.

Particulars may be obtained of the AUCTIONEER, as above.

By order of Executors and other Owners.

GAS AND WATER STOCKS AND SHARES
IN THE
MAIDENHEAD GAS COMPANY, GREAT YARMOUTH WATER COMPANY, GORING AND STREATLEY GAS AND WATER COMPANY, HENFIELD GAS COMPANY, LIMITED, AND PORTSEA ISLAND GAS COMPANY.

MR. ALFRED RICHARDS will Sell the above BY AUCTION, at the Mart, E.C., on Monday, Feb. 14, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, as above.

By order of the Directors of the

PLYMOUTH AND STONEHOUSE GASLIGHT AND COKE COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, E.C., on Monday, March 7, at Two o'clock, in Lots,

£10,000 OF ORDINARY STOCK
OF THE
PLYMOUTH AND STONEHOUSE GASLIGHT AND COKE COMPANY,

Ranking for a Standard Dividend of 5 per cent., subject to the Sliding-Scale; the last Dividend on similar Stock in the Company having been at the rate of 6½ per cent.

Particulars may be obtained at the COMPANY'S OFFICES, 1, Athenæum Terrace, PLYMOUTH; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

CROYDON COMMERCIAL GAS AND COKE COMPANY.

SALE OF £2500 FIVE PER CENT. PERPETUAL DEBENTURE STOCK AND £5000 "B" ORDINARY STOCK.

MESSRS. HOOKER AND WEBB have received Instructions to SELL BY AUCTION, at the Offices of the Company, Katharine Street, Croydon, on Monday, Feb. 21, 1898, at Six o'clock precisely, in 85 Lots,

£2500 FIVE PER CENT. PERPETUAL DEBENTURE STOCK AND £5000 "B" ORDINARY STOCK

of the Croydon Commercial Gas and Coke Company. The Dividend paid on the "B" Stock for some Years has been at the rate of 11 per cent. per annum; and it is capable of further increase. The Sale therefore offers an unusually good opportunity for safe Investment.

Particulars and Conditions of Sale can be obtained of Mr. W. J. RUSSELL, the Secretary, at the Offices of the Company, Katharine Street, CROYDON; Messrs. BLYTH, DUTTON, HARTLEY, AND BLYTH, Solicitors, 112, Gresham House, LONDON, E.C.; and of the AUCTIONEERS, 4, High Street, CROYDON.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of FIRE-BRICKS, RETORTS, &c., for their various Works.

Full Particulars to be obtained from the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed Tenders, endorsed "Tender for Fire-Clay Goods," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 24th inst.

SAML. BROWN,
Town Clerk.

Town Hall, Salford,
Feb. 4, 1898.

COLNEY HATCH GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, New Southgate, on Thursday, the 24th of February, at Five o'clock in the Evening precisely, to receive the Report of the Directors, and the Accounts of the Company for the Half Year ended the 31st of December, 1897, to declare Dividends, to elect Directors, to appoint an Auditor, and for other Purposes.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street,
London, E.C., Feb. 4, 1898.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the White Hart Hotel, Bromley, Kent, on Thursday, the 24th day of February inst., at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance-Sheet certified by the Auditors, to declare Dividends, and for General Purposes.

Notice is also Given, that at such Meeting a RESOLUTION will be submitted to RAISE, by the creation of Debenture Stock, A FURTHER SUM OF £2500 and to authorize the Directors to issue such Stock, at such times, upon such terms, in such manner, and subject to such conditions as they may think fit.

The TRANSFER BOOKS WILL BE CLOSED from the 10th to the 24th inst., both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices at the Works: Bromley,
Kent, Feb. 5, 1898.

RIDDINGS DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, No. 80, Gracechurch Street, in the City of London, on Friday, the 25th day of February, 1898, at Three o'clock in the Afternoon, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect a Director and an Auditor in the place of those retiring by rotation, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 12th to the 25th inst., both inclusive.

By order of the Board,
ALFRED LASS,
Secretary.

Offices: 80, Gracechurch Street,
London, Feb. 7, 1898.

MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.
(INCORPORATED BY ACT OF PARLIAMENT, 1837.)

NOTICE is Hereby Given, that the SIXTY-SECOND ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-Room, at the Works, Mitcham, in the County of Surrey, on Tuesday, the 22nd day of February, 1898, at Three o'clock in the Afternoon precisely, to receive the Report of the Directors and a Statement of the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in place of those retiring by rotation, to reconsider the Remuneration of the Directors and Secretary and Manager, and for General Business.

The TRANSFER BOOKS WILL BE CLOSED from the 7th inst. until after the meeting.

By order,
BENJAMIN GREEN,
Secretary and Manager.

Offices and Works: Western Road,
Mitcham, Feb. 1, 1898.

PATENTS, DESIGNS, AND TRADE MARKS ACTS, 1883 TO 1888.

NOTICE is Hereby Given, that Thomas ROWAN, of Decomet, St. Kilda, Melbourne, Victoria; Sydney Alexander Bailey, of No. 6, Fowkes Buildings, Great Tower Street, London; and Thomas Rowan, formerly of 174, Amherst Road, Hackney, Middlesex, but now of 5, Rosslyn Gardens, Hampstead, have applied for LEAVE TO AMEND THE SPECIFICATION OF THE LETTERS PATENT No. 6027 of 1895, granted to Thomas Rowan for "Improvements in the Method of and Means for the Economical Use of Gas for Lighting Purposes."

Particulars of the proposed Amendments were set forth in the "Illustrated Official Journal (Patents)" issued on the 2nd of February, 1898.

Any person or persons may give notice of opposition to the Amendments (on Form G); at the Patent Office, 25, Southampton Buildings, London, W.C., within One Calendar Month from the date of the said "Journal."

(Signed) C. N. DALTON,
Comptroller General.

FELL AND JAMES,
1, Queen Victoria Street, London, E.C.,
Agents for the Applicants.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Offices of the Company, No. 68, Chancery Lane, in the County of Middlesex, on Friday, the 25th day of February, 1898, at Half-past Three o'clock in the Afternoon precisely, to receive the Report of the Directors, and the Accounts for the Half Year ended the 31st of December last, to declare Dividends, elect two Directors and an Auditor, and to transact the Ordinary Business of a General Meeting.

Notice is Hereby also Given, that an EXTRAORDINARY MEETING will be held immediately after the General Meeting, when the subjoined Resolution will be proposed:—

"That the Directors be, and they are hereby, authorized, in pursuance of the powers contained in, and in the manner prescribed by, the Hornsey Gas Order, 1884, and the several Acts of Parliament incorporated therewith, TO CREATE ADDITIONAL CAPITAL by issuing the remainder of the authorized Capital at such times, of such amounts, of such denominations, and subject to such Conditions of Sale and Provisions within the powers of the said Acts as the Directors may from time to time determine."

The TRANSFER BOOKS WILL BE CLOSED from the 12th to the 25th of February, both inclusive.

By order of the Board,
S. J. WILLIAMS,
Secretary.

Offices: 63, Chancery Lane,
London, W.C., Feb. 4, 1898.

Price, Bound in Cloth, 5s. 6d., Post Free.

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OF
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SILICA BLOCKS,
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OF SUPERIOR QUALITY
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GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

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WORKED BY THE
WEARDALE IRON & COAL Co., Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895,*

Yield of Gas per Ton	10,500 Cub. Ft.
Illuminating Power	16·9 Candles.
Coke (of good quality)	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

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The Gas Companies' Expenditure Journal.
With Printed Headings and Analyzing Guide, for keeping the Expenditure of Gas Companies upon the easiest and most correct method, and in accordance with the provisions of the Gas-Works Clauses Act of 1871. Size, 16½ in. by 17½ in.
Price: Half-bound, cloth sides, two quires, 33s.; three quires, 45s.
This Book and its predecessor (on the same principle) have been in use since 1867.

The Gas Companies' Rental Book.
A companion Book to above with Printed Headings and Illustration, for keeping the Consumers' Accounts.
Size and Price as above.

The Analyzed Wages Book.
Compiled for use in conjunction with the above Expenditure Journal, with Printed Headings. Size, 15 in. by 10½ in.
Price: Half-bound, cloth sides, two quires, 15s.

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BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

HEATHCOTE GAS COAL.
Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.
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Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

Note.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

HOLMSIDE
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Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . . 11,205 Cubic Feet.
Illuminating Power $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. per Ton.
Sulphur . . . . . A litle over 1 per Cent.
Ash . . . . . Under 1 per Cent.
Tar . . . . . 163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor 103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England, and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR
PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

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For Particulars, Price, &c., apply to Mr. Edward Price, 119, Queen's Road, Finsbury Park, N.

Prices are Reduced.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per ton .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

For Prices, &c., apply to

W. H. PARKINSON,

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See "Journal of Gas Lighting," Ju'y 7, 1896, p. 19, and Dec. 21, 1897, p. 1365.

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Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

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Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

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Yield of Gas per ton . . . . . 10,500 cub.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

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or

E. FOSTER & CO.,

21, John Street, Adelphi, London, W.C.

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—FOR—

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RETORT BENCHES ERECTED COMPLETE WITH OR WITHOUT SPECIAL FURNACES.
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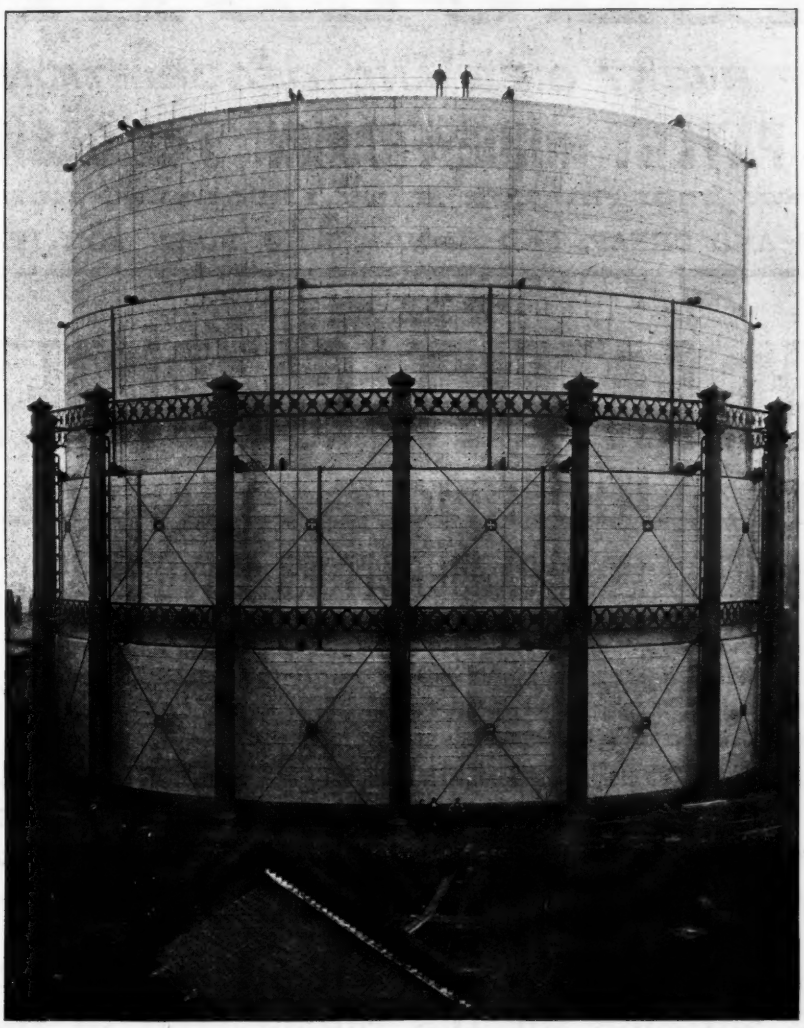

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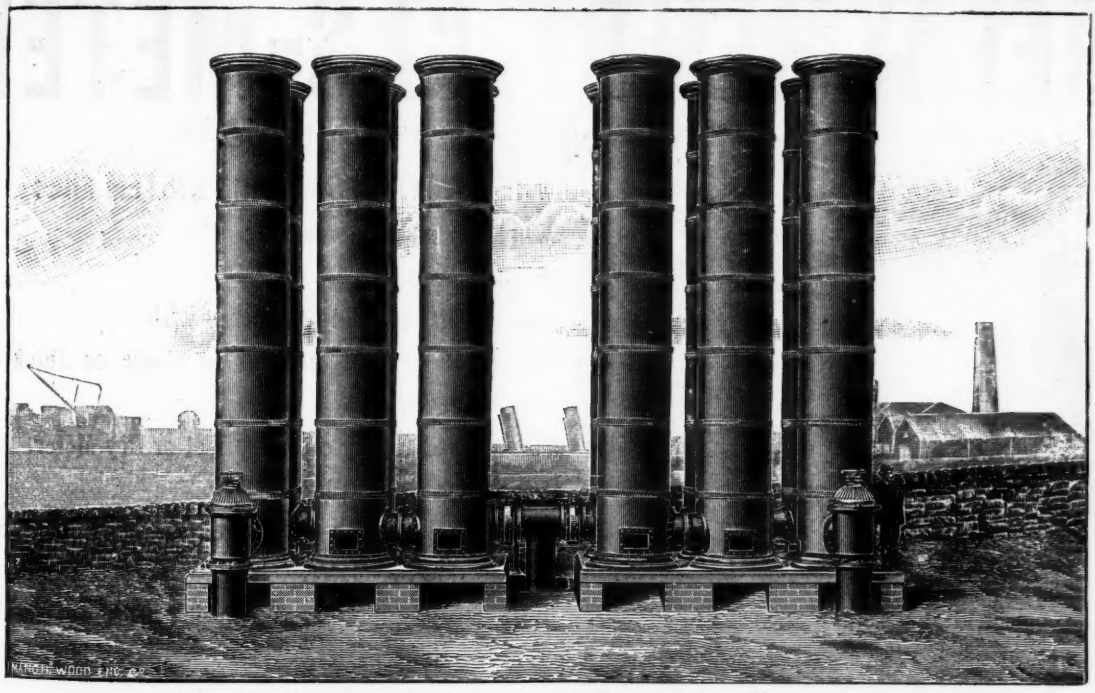

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BEG to announce that, having made arrangements for the Manufacture of their **BURNERS** in England, they are **NOW ABLE TO SUPPLY THESE IN ANY QUANTITY.**

These Burners (with Mantles specially made for the Syndicate by the Incandescent Gas-Light Company, Ltd., under the Welsbach Patents) are admitted by all Experts to be the **BEST AND MOST ECONOMICAL LIGHTS FOR LARGE AREAS AND PUBLIC STREETS.**

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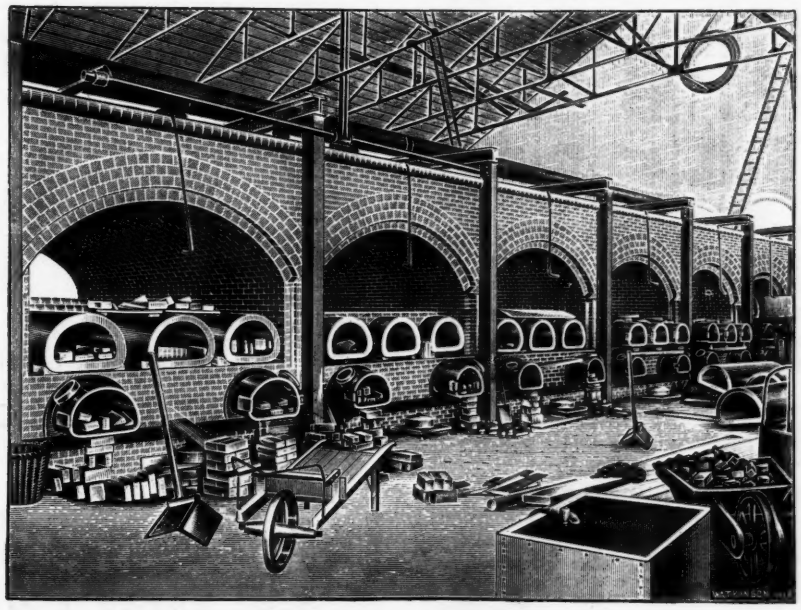

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Old Systems easily and cheaply converted.
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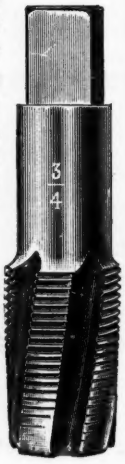

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[See Illustrated Advertisement, Feb. 1, p. 213.]

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WITH PATENT SHADE.

The ONLY GAS-PENDANT suitable for Domestic Lighting; a room 18 ft. by 14 ft. being beautifully illuminated with one Incandescent Burner.

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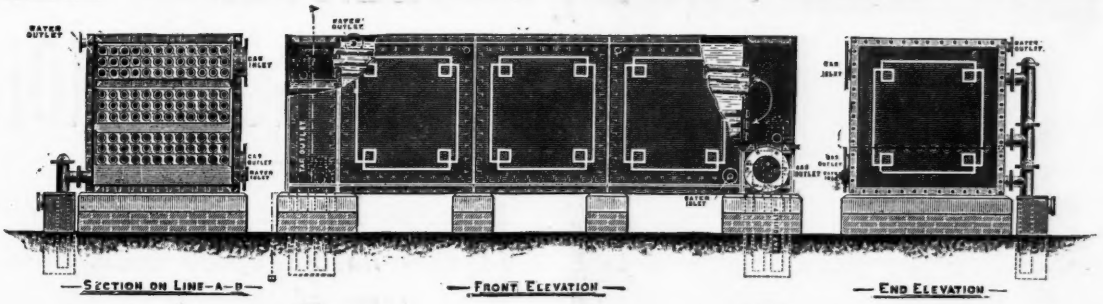

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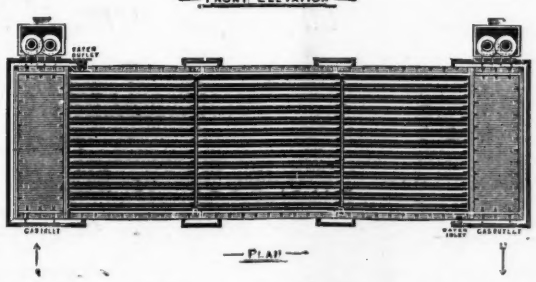

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[See also Advt. p. 272.

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